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Vol. 5 No. 7

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ATARI 64

YOUR COMPUTER

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"NEVER DID TRUST THAT SINCLAIR"

THE SINCLAIR CYNICS have turned full circle. They sneered at his first sub-£100 ZX-80 five years ago, and now they're back rubbing their hands in glee at the first major financial crisis to face him in five years' home computing.

Between the early black box days and the blacker months of early 1985 they jostled to talk to him and listened avidly to his Cromwellian views on *Question Time*. Now they seem to have conveniently forgotten that it was Sinclair who turned the U.K. into the most sophisticated computer market in Europe.

Of course the delayed-delivery and reliability problems that have beset all his machines have left a mark in people's minds, but his achievement in giving Britain more computers per capita than any other country mustn't be played down.

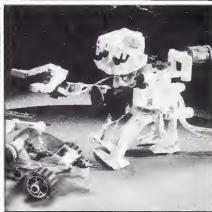
The disasters that have hit other home computer companies — Acorn, Oric and Dragon — have made his search for £10 million to £15 million for "financial reconstruction" particularly difficult; and the C-5 electric bidet hasn't done much to help. Despite the politicians' and the City's often confessed undying love for new technology, they run a mile when faced with the real thing. They'd rather invest in cabbages than computers.

Behind Sinclair's cash crisis lie many reasons, some common to all computer manufacturers, others unforceable. Christmas was bad everyone agrees, but nobody thought it was as bad as the £30 million of unsold Sinclair stocks seem to show.

The main obstacle between Sinclair and a flow of new funds is the understandable fear that he has become a one-product company — the Spectrum. And many believe that even that machine is well past its money-making heyday as it celebrates its third birthday in a quiet summer.

Sinclair's hopes are pinned on summer pocket TV sales balancing up the computer market's lopsided Christmas booms. He still believes the QL will make its long-awaited impact — he's planning to give a September release to a half megabyte wafer-scale technology disc drive for it.

Apart from red faces in the highest places in the land, Sinclair's difficulties may at least show that new technology is perhaps not such an easy solution for rebuilding the nation's wealth.



"Take me to your teacher."

CHALKIE ROBOTIX

ACTION MAN lookalike Gaxon Graves is teaching Welsh 10-year-olds Logo with the help of his control vehicle Robotix.

Robotix is a £60 construction kit including four motors, five channel control and 100 parts which kids can use to construct 10 different vehicles and robot arms. In America, where Milton Bradley has been selling Robotix

for a year, it is already available with an Apple interface and software. Now David Wharry of the Micro Electronics Programme and Patrick Drewett, a teacher at Coed Ewa Junior School, Cwmbran, are experimenting with Robotix kits linked through a Deltronics controller to BBCs to teach the principles of problem solving, control and technology.

MSeXtra res

PRIVATELY MSX computer makers are showing off the new extended specification MSX-E micros with 512x192 resolution, 80-column text display, 256 colours and nine-voice sound which will go on sale in Japan this autumn. Publicly in Britain the likes of Sony, Toshiba and Mitsubishi insist that they will be selling only the existing under-specified over-priced MSX machines until after Christmas.

Toshiba, which has sold more MSXs than anyone else in Britain, unveiled its MSX-E, HX-23 and HX-22 micros at the consumer electronics trade shows in London last month. The 23 has 80K of video Ram and can inter-

face to a video disc player. JVC also showed their current MSX hooked up to a video disc running a demonstration golf game. As promised at the MSX launch, MSX-E retains upwards compatibility — it will run all existing MSX software — although, of course, new programs written to take advantage of the expanded MSX-E graphics and sound capabilities will not be downwards compatible.

In Japan MSX-E machines will start at around £350 — although some will include a built-in disc controller. Others may go further — Spectravideo is building in a complete disc drive.

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EUREKA FOR ORIC

Normans conquer Atmos

EUREKA INFORMATIQUE, which distributes British computers in France, has bought Oric for several hundred thousand pounds and will move production of Atmoses to its computer peripheral plant in Normandy later this month.

Oric, which announced its Spectrum-bashing 16 and 48K Oric 1 at the end of 1982 suffered repeated financial crises and uncertainty which prevented it from competing successfully with Sinclair in Britain, although as Jean-Claude Talar, Eureka President points out it "enjoyed a good reputation in France".

Earlier this year Oric had to finally call in the receiver who has sold all rights to Oric's future plans for home macros including the Stratos and a 68000 based machine, as well as substantial stocks of components, half-built, and completed Atmoses to Eureka. Oric's other assets, including chip designs for an ultra low-cost IBM compatible will be sold elsewhere. Initially Eureka intends to assemble Oric's in Normandy, until the stockpile of



Stillborn Stratos.

components runs out, and sell them in France.

In August or September, Eureka will decide whether to go ahead with Stratos, a 64/128K micro with a built-in disc interface and perhaps modem, and whether

to go back into the British market.

British Oric owners lost their warranties when the company crashed but Eureka will be announcing details of a new support service for software, repairs and peripherals next.

Atari 520 not out CPC 128 declared

YORKIE MAN Alan Sugar sold us a dummy last month when he launched his disc-based CPC 664 without the extra Ram we'd predicted. But now the Atariard 128 has appeared — in Chicago at the Consumer Electronics Show.

Enterprise, meanwhile, has named the price for its 128K micro which has 113K user memory and is 30 percent faster than, yet compatible with, its 64K cousin. Companies like U.S. Gold, Ocean, and Danmark with its new James Bond game, are now writing Enterprise versions. The 128K micro will cost £250 while the 64 drops to £180 — that for a machine with 672x512 resolution.

Down in Slough, Atari's first batch of STs — only 520 of them oddly enough — are now with software houses and the like. First consumer deliveries should be through Atari loyalists Silca shop in Sidcup.

WE'RE ALL GOING ON A CBM HOLIDAY

COMMODORE ENGINEERS from Britain and Europe flown to California to see the Amiga are impressed with the graphics. CBM's new 68000-based micro will hit the U.K. in 1986 and its £1,200 price includes a 3.5in Sony disc drive and a two-button mouse.

But the graphics chips will appear in future Commodore home computers. Resolution is better than TV quality — up to 1024x800, and 4096 colours all available through a GEM-like operating system. You can have five windows on screen with 16 colours in each. Amiga also has a built-in synthesiser to sound the battle cry against Tramiel's "Suzie".

Commodore is also offering free trips to anyone who will take a CBM-64 off their hands this



Chicago price tag for 128 was \$300.

summer. For £199 you will get a 64, C2N Data Recorder, a brilliant game — International Soccer — and three days free accommodation at one of 250 hotels in Britain and Europe. A Commodore from man was able

to reassure the unduly cynical that you would have some choice: "the hotels are not all in Sutton or Albania". The Plus 4 is being packaged with a 1541 disc drive, MPS 801 printer and Impact business software for £450.

Remember Harold in 1066 Maggie

NOW THAT Halley's Comet is almost within range for amateur astronomers, Eclipse Software's £7 prediction program for the Spectrum can show you where in the sky to find it — for any time, date and latitude — important because many comet watchers may flee south to Australia for the best view of the giant snowball as it becomes visible to the naked eye late this year and early in 1986.

Gooch out for 64

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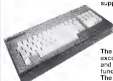
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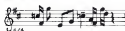


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DIARY

IF YOU ARE privileged enough to walk around Acorn's corridors of power and hear a cry of Alex Uboldi, it is probably not a comment about worried looking Chairman Alex Reid's rapidly thinning hair. Alex has much to worry about, what with the share price at an all time low of 9p, rumours of disaffection from Chris Curry, and PR firm Quantum Bell ditching Acorn because the company had so little to publicise. Olivetti has now put in an Italian, Alex Uboldi, as Managing Director of Acorn.

TRAMMILL still managed to surprise Chicago by launching the 260ST after all, at the Consumer Electronics Show. 256K Ram with a built-in 500K Sony drive and a black and white monitor will cost \$500.

STILL AT CBS, rival British software houses seen dragging bags full of cash around as they try to outpace each other bidding for U.S. blockbusters. Wary of disappearing British companies, the Americans are demanding, and getting, six-figure royalties for their games with up to \$50,000 up front.

SOMEONE AT ULTRATEC has just discovered rude words and for some reason has decided to fill the loader program of the AMSDISK tape to disc utility which they sell, with abuse.

We heard about it from J. Shaw, whose 11-year-old daughter was given Amsdisk on her birthday. She called him in after listing 70 lines of abuse which include the line "I've left Basic unprotected to let people see those f***ing comments". Now Shaw, who tells us that has occupation allows him "access to computer files" and that he has "given the tape to my superior for a decision to be made regarding prosecuting" has sent a copy of the offending lines to the Trading Standards Office.

We cannot guarantee that anyone who sends money to Ultratec will now be sent anything in return while an investigation is carried out into the legality of sending obscene listings through the post.

Elsie Dee

DON'T TOUCH

Software industry at risk

"DON'T TOUCH" is the advice Tim Langdell of the Guild of Software Houses is giving to anyone tempted to use Evesham Micros Interface III to copy software tapes. One touch of the button once you have loaded the program and the Interface III dumps the whole contents of a Spectrum's memory onto micro-drive, evading all the protection devices so far developed for commercial software.

Evesham advertises the unit for making back-up tapes but Roger Tuckett of the Federation against Software Theft points out that the William Powell Computer Copyright Bill should become law this month and then making back-ups other than for research and private study — which is narrowly defined — will be a breach of copyright. Selling copies is punishable by fines and imprisonment. Tuckett condemns "companies like Evesham Micros which sell machines under the guise of making back-ups".

Langdell does not believe that there is any such thing as an innocent copy. "I have never found the need for a back-up — you have to do something extreme to a tape, like dropping it near a magnet or letting the dog chew it." If a program does not load as easily on the 1,000th occasion as it did on the first, GOSH believes



A crime is about to be committed.

that the software house should replace it.

Up until Interface III, better software protection had made it more difficult to break into

programs while speed loaders had reduced tape to tape copying. A new wave of piracy could be the last straw for ailing software houses.

PLUS, TV AND PRINTER £200



Sinclair tries to wake up Spectrum sales.

SINCLAIR IS BUNDLING up a Spectrum, flat screen TV, ZX Printer and software including Vu 3D, Chess and four other games for £199 in a summer offer through Dixons. Although you cannot use the £100 miniature

screen with your micro — it has no aerial socket — Sinclair's reasoning is that a go-anywhere TV is the sort of product that will appeal in the summer when computer sales are otherwise at their lowest.

Brussels spurs cards

IN THE WAKE of the Brussels European Cup soccer disaster, football clubs are starting to take Sperry's idea for providing computer identity cards for fans to curb hooliganism seriously. Chelsea is signing up and Stockport, Bournemouth and Reading, amongst others are considering similar systems. Although the scheme has been written off as unworkable by Ted Croker of the FA and Chief Constable Anderson of Manchester, small First Division clubs like Luton and Oxford which plan to ban all away fans from league matches might find the Sperry Systemolve plan effective.

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18	Overdrive	Superior Software	5p
19	Bumper Bungle	Alligata	5p
20	Alvin's	Ultimate	5p
Sp = Spectrum	AI = Electron		

TOP 3 BY MACHINE

1	FLIP	M. Tronic	Vic
2	Poolman	M. Tronic	Vic
3	Blackie the Brickley	Flunkit	Vic
1	Basketball	GBM	64
2	Games of Darn	Virgo	64
1	Cricket	M. Tronic	64
1	Starline	Mel House	8p
2	Booby	Flunkit	8p
3	Brace Lee	US Gold	8p
1	Football Manager	Addictive	8p
2	Wildcard	Imagine	8p
3	File	Accesoft	8p
1	Bruce Lee	US Gold	AI
2	Spillins Ace	US Gold	AI
3	Fort	US Gold	AI
1	Apocalypse	Mel House	16
2	BMX Racers	GBM	16
3	Enriched	Mel House	16
1	Derivative	Superior Soft	8p
2	File	Accesoft	8p
3	Football Manager	Addictive	8p
1	Globe	Activision	Am
2	Gambit Lynx	Dunell	Am
3	Reduction	Ocean	Am
1	Shosh	Activision	Ms
2	Crazy Golf	Mel Micro	Ms
3	Jet Set Willy	Projects	Ms
Vic = Vic 20 64 = GBM 64 5p = Spectrum 8p = BBC AI = Atari 16 = GBM 16 AI = Electron Am = Amstrad Ms = MSX Source = Waltons Software			

MAXAM IS VINDICATED

MAY I reply to Nick Godwin's attack on our products printed in June's Letters Page.

Our policy is simple. We find it morally unacceptable to market software knowing that it does not perform to the advertised specification. We are grateful to any customer who can substantiate their claim that a program contains a bug. In such instances, or where type duplication is faulty, we replace it without quibble. As features have been added to MAXAM upgrades have been offered to old customers.

Now to Mr. Godwin's two-pronged attack. He wrote to us in March praising the product and with a request to "borrow" a Rom version, after mentioning a couple of mythical bugs. These bugs do not and have never existed — even in the earliest production copies. Bugs as serious as those reported by Mr. Godwin would have been spotted months ago by the 5 in-depth magazine reviewers, the dozens or more leading software houses and the 500 plus owners of the various versions of MAXAM!

His second, rather more invidious attack on my marketing strategy, together with his pontificating on the merits of a Rom-based utility at all, show an alarming degree of general ignorance for a man in charge of a user-club newsletter. Our marketing strategy is based on factual information, and in support I can refer you to the June edition of *Amstrad Computer User*, containing a detailed article written by someone rather more clued in than Mr. Godwin.

David Fisk
Amstrad Limited
London SE25.

Editorial comment: We find David Fisk's reply wholly convincing. A number of readers have confirmed that Amstrad's cassette-based assembler is bug-free, and, indeed, an excellent program. As for the Maxam Rom we stand by the judgement of our May review that "this looks like a product no serious Amstrad user can afford to be without."

SLOPPY PROGRAMS

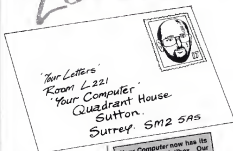
I REALLY CAN'T let you get away with your article in May's First Bytes, entitled 'Elegant Programming'. I cannot fault the third or the first program — an earlier version — but two out of six is not enough for progress of this size.

The first thing that a beginner must learn about loops is that you should not jump out of them. Some Basics are more tolerant of this than others, and with all of them it will be forgiven in a very short program, but it is surely something that any programmer must discipline himself to avoid. Program 2 gives the game away. Line 20 reads:

20 IF L = 7 THEN ?"SEVEN"
L = 10 GOTO 40

The whole point is that by making L = 10 you do not need the Goto. The

YOUR Letters



program will leave the loop naturally — and more quickly, in Program 5 IF 03 = "ORANGES" THEN 00 should be changed to

THEN L = 5
for the same reason.

Program 4 has its semicolon between "Countdown" and CD. I am aware that you don't need one on the Apple, but most computers would crash here.

Program 6 is more spectacular with two jumps out of a loop, an error in line 30 that would produce the opposite statement to the required if it ever got there. On most computers it is unlikely to do so, as the Mod5 will have to read beyond the end of the string. Line 30 should be
FOR L = 1 TO LEN(A\$) - 2
and line 50 should start

IF L = LEN(A\$) - 2
if we must do that way. Better to start line 50 and add 65
?"NO MATCH"END

I took Program 1 to heart. I am sloppy. Whether you put Next or Next D is a matter of style. The former saves space and is quicker, the latter

Your Computer now has its own Prestel Mailbox. Our number is 019091600. If you have any program enquiries send us a message. We will try and give you an answer within a few days.

is more readable. I did not think one was wrong and the other right. But I have taken the message to heart, and decided that I would rather be sloppy than elegant.
Geoffrey Childs,
Widnes, Cheshire
Glossop, Greater Manchester

SPECTRUM TIPS

SPECTRUM owners may like to use some of my suggestions.
POKE 23559,0 makes the Spectrum crash if anything is printed in bottom part of the screen, e.g. error messages or breaks. (To disable this routine use Poke 23559,2)

PRINT USR 0 Completely clears the memory (New only clears the Basic)

(Continued on page 18)

'AMSTRAD CPC 664 IS OK'

MAY I be so bold as to suggest that Mr Lee Padden takes a driving lesson or two before he tries to rev up another computer.

I noticed in the review he did of the Amstrad CPC-664 several unfortunate mistakes. These errors could I suppose influence potential purchasers of this fine machine into looking elsewhere.

For a start the 3in. discs have when formatted for a CPM system disc 160k, or as a Data disc i.e. no CPM 175k or in IBM format 154k. Additional to the free space is a 2k directory on each side. A renumber command is included in the Basic.

With regard to the Warm Reset, what point is there in a warm reset if you have very good On Break Goshub protection. And if one were to read the manual it details how to define a function key to reset the mode and colours etc.

All in all I suppose it was a reasonable review but for the fact of the above errors.

S. Potter,
Bromley,
Nottinghamshire.

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IN★ TOUCH

How to write for Your Computer

We called this magazine Your Computer precisely because we welcome your views, tips and hints and even your criticisms of machines and software in general. Here's how you go about getting your name into print. Your article should be typed, double-spaced, on A4 paper. A name and address on each sheet would help. Don't forget to tell us which machine it runs on. With programs please include a cassette or disc and some indication of how long it is. Please put what machine it's for on the envelope. Don't forget full instructions to us how to load and list your program and how to enter it for the readers.

The article must be submitted exclusively to Your Computer. We pay £35 per published page — that's as it appears in the magazine and includes illustrations.

Telsoft

Telsoft is Your Computer's software downloading service. Any program for the Spectrum or the BBC — which has a telephone symbol next to it is available on the service. Both 1200 and 300 baud speeds are catered for. For more details call Colchester (0206) 8008. No more lonely nights typing in endless pages of hex digits.

Message service

You can get messages to us in two ways. Either use the Prestel Telex Link to 892084 BISPRIS G or you can use our very own modem, day or night on 01-661 8978. The modem is V21, 300 baud, even parity, 10 bits per character. You simply transmit in upper case "YRC" — our address code, and wait for the acceptance code "+++" STG GO". Then off you go. Don't forget to tell us who it's for. Sign off with "NNNN" — again in upper case.

(continued from page 17)

9300 FOR F=1 TO LEN AS PRINT
ARI) BEEP (6.0 NEXT I RETURN
prints on newflash style. It is meant
to be used as a sub routine. To activate
use LET AS="message to be
printed", then set the printing
variables. For example:
PRINT AT x,y;

and

GOSUB 8000

I have noticed that the Spectrum has
a facility to convert binary numbers
to decimal but it doesn't have anything
to convert decimal numbers to binary,
so I have written a routine to serve this
purpose. Poke the decimal number
that you want to convert into location
16384, then run this routine:

```
1 LET AS="" FOR F=0 TO 7 LET
AS=AS+STR$(POINT173)NEXT
FPRINT AS STOP
```

Nail Baguena,
Naffton,
Aron.

SPRITES BUG

I HAVE just discovered a bug in the
listing for my Sprite Basic article in
the June issue which prevents the two
commands Break On and Break Off
from operating correctly. However,
the bug can simply be cured by
loading the machine code, and then
running this program:

```
10 FOR J=62780 TO 62850 STEP
-1
20 POKE J+21,PEEK J NEXT J
30 FOR J=62850 TO 62870
40 READ N:POKE J,N NEXT J
50 DATA 7,38,114,101,97,107,115,
110,168,237
60 DATA 8,98,114,101,97,107,115,
102,102,175,237
70 POKE 60136,208
80 SAVE "SPRBSCODE" CODE
80000,2800
```

Robert Newman,
Chundie,
Peterborough

HACKERS BAD

THE DEFENCE of electronic shoplifters
— hackers — in your May Reader was
quite touching, implying that all they
are interested in is helping big business
to tighten up the security of its

YOUR Letters

computer systems

If an intruder was apprehended in
your office in front of your safe, which
he had just opened, and he claimed
that he was not really interested in the
contents at all, but that all he was
trying to do was to demonstrate to you
that your security was lax, would you
really just thank him kindly and send
him on his way, perhaps with a reward
for the kindness he had done you?

I think the naivety of your reader
writer is surpassed only by that of the
author of the Hacker's Handbook if he
really believes what he wrote in the
quotation you give from his book on
page 49:

I. Howard Wingle,
Sawhite,
Gloucestershire.

SNAKES ALIVE TIP

THANK YOU for publishing my
corrections for the game Snakes Alive!
last month. I am pleased to say that
it is now enterable, and should work
straight away.

For those that are still having
problems though, a couple of large
checkmarks might help locate the
source of your error. There are 617
851 for listing 3 and 377 062 for listing
2. Just write a loop to add up all the
contents from 28384 to 32163
inclusive, and these two numbers
should be returned for their respective
listings.

For those that have successfully
typed in all the code, congratulations!

If you are having problems getting
the snake around all 48 locations, here
are a couple of "cheating" Pokes that

should (only for a while!) make things
easier.

POKE 25803, any number from 1
to 255 (poked as 0). This is the
initial SPEED value. Note that it is
actually a two-byte variable, and
large values will be very slow —
avoid them! The first byte, at
25802 should only be POKED with
caution — it must always be a
multiple of four. Normal value for
the second byte is seven.

POKE 25707, any number correspond-
ing to a character from 1 to 9 (ie
49-57). This is the initial number of
LIVES.

These POKES should be typed
after loading in the finished code.

These should make things easier for
those weak souled people who can't
stand the challenge. (Of those life die
that just aren't fast enough!)

To cater for those who have bought
cassettes off me, the same two effects
are achieved by holding down keys D
and A while the last block of the
normal load version loads. You will
then be prompted.

D.R. Appiah,
Arenmouth,
Essex

BITS 'N' BOBS

Line 2510 in June's Amstrad program,
Engelbert, is unclear. The last
statement should read:

```
PRINT 148:GOTO 1
```

The Spectrum and CBM 64 listings
in June's Top Tip managed to get
themselves mixed up. And on top of
this B. Ruckley's listing — for the
Spectrum — contains an error in line
50. The USSR address should read
84721, not 8472.

Lastly, line 45980, Listing 2 of
June's Spectrum program Wizard's
Den, reads
45880:303C42424242C0C0=384

ARE WE UNDERMINING THE ORGANISATION?

MAY 1, as a headmaster of a large
comprehensive school whose
library accepts your magazine
Your Computer, complain in the

strongest possible way about the
June edition.



On page 51, where in the
bottom left hand corner you claim
no responsibility for what you
print, you make two comments
which are obviously aimed to
undermine the organization of
both schools and examination
boards:

- "... which might help you
break into the computers that
store examination records".
- "when you send your idea,
... for cheating in an exam or
pulling off a scam ..."

We feel very strongly at this
school that your magazine should
not be allowed to be on display in
our library if such comments are
to be repeated in future editions.

J.W. Barrett,
The Lindsey School,
Clacton.

Scaling new peaks

PEEK AND POKE are — like Burke and Hare or Hefter and Sauter — names guaranteed to strike terror into the hearts of most God-fearing folk and certainly all novice programmers.

After all, when you're only just getting the hang of making your screen display look something like the way you yourself, after hours of juggling Print and Tab statements and a conglomeration of semi-colons, it's hardly surprising that you'd rather leave the mysteries of memory addresses alone.

But you'll have to tackle Peek and Poke some day, and there's no better way to start than by experimenting with the chunk of memory that controls your micro's screen display.

First, let's remind ourselves what the statements Peek and Poke really mean. Although every micro has a total memory expressed as 16K — that is, 16,000 bytes — 32K, 64K or whatever, some of that memory is gobbled up by the computer's operating system — including the Basic that makes it easy to write programs — so that in the Commodore 64, for example, just over 39K of RAM is left for your own Basic use.

Check out your micro's manual and you should be able to discover what chunk of RAM is swallowed up by the screen — and, possibly, colour — memory. The 64, for instance, offers a screen display "crusade" of 40 characters across and 25 down — a total of 1000 squares. Each square needs a byte to itself; and so its screen memory occupies the 1000 addresses from 1024 to 2023. Unlike some micros, the 64 needs a separate colour memory for each of those 1000 squares, and this squats at addresses 52296 to 56295. In the Commodore 16 and Plus/4 screen and colour memory runs from 5072 to 4071 and 2048 to 3047 respectively. The Spectrum QL screen uses addresses 131072 to 163839, and the Amstrad CPC-464's screen memory occupies 49152 to 55535.

In the demos and programs which follow, we'll cut down on finger fumbling by first declaring a variable equal to the first screen/colour memory address. For the Commodore 64, you'd need a line like this:

```
%0 SM = 1024 CM = 52296
```

You can think of a block of addresses as a huge rack of cubby holes, such as you might see in a small storage office, all have glass doors so that you can see — or Peek — what is inside — but only some of them can be opened so that you may Place — or Poke — something into an empty one, or replace the existing contents with something else.

That "something else" is a different value in the range 0 to 255. In the case of a Poke to screen memory, you'll be using a value chosen from the ASCII — pronounced askey — or machine-specific table of screen codes representing the usual alphanumeric keyboard set as well as the special graphic symbols available on some micros.

Again, there should be a list of these in your manual, but be clear that



ASCII and screen codes are different again from the table of CHR\$ values for the same characters. ASCII screen codes constantly run from 0 to 127 — with the alphabet beginning at 1 — with screen codes 128 to 255 usually producing the same character set in reverse field form. Now add these lines:

```
30 FOR L = 0 TO 9
40 POKE SM + L,1
50 NEXT L
```

These lines, as you'll see when you Run them, will serve to Poke the letter A into the first 10 screen memory addresses. They all now hold, of course, the value 1. Print it:

```
60 PRINT PRINT
70 FOR L=0 TO 19
80 PRINT (PEEK(SM + L));
90 NEXT L
```

Run the whole program again, and after the As have appeared, the three new lines will cause the figure 1 to be

BEGINNERS

first bytes

printed the same number of times, and then you'll see 10 zeros. That's because the next 10 addresses in screen memory — in common with all the remainder — hold no value at all. Now alter line 40 to:

```
40 POKE SM + L,1
```

for a different result. Finally, enter in direct mode:

```
POKE SM + 532
```

and notice how this wipes the character held there, as a direct mode PRINT (PEEK(SM + L)) will confirm.

To introduce a little colour into the proceedings, set your page variables in 10 line as before and then type:

```
30 FOR L = 1 TO 10
20 POKE CM + L,L
40 POKE SM + L,1
50 NEXT L
```

Colour codes are usually separately numbered from 0 to 15 or higher, so line 30 simply prints out the first 10 characters in the first 10 colours available. Incidentally, it's better to Poke colour before screen memory, otherwise you'll often get an unsightly double image as each character appears, sweep lines 30 and 40 to see this effect.

Using Pokes, this next routine pro-

duces a quite mesmerising, ever-changing kaleidoscopic display of all the characters and colours your key board can generate. It's also ideal for automatically generating sleeve designs for the Eurhythmic Lane 20 declares the correct variables for a Commodore 64.

SC should equal your micro's main screen number of character-producing ASCII screen codes, CC the number of colour codes available, SL the total screen locations, and NC the maximum number of characters to a line, after these variables as necessary to the equivalents on your micro:

```
10 PRINT (CLEAR SCREEN)
20 SM = 1024 CM = 52296
30 CC = 255 CC = 15 SL = 1000
NC = 40
30 F1 = INT(RND(1)) * SC + 1
40 F2 = INT(RND(1)) * CC + 1
50 F3 = INT(RND(1)) * NC + 1
60 F4 = INT(RND(1)) * CC + 1
70 FOR L = 1 TO SL STEP F3
80 POKE CM + F2 + L, F4
90 POKE SM + F1 + L, F1
100 NEXT L
110 GOTO 30
```

You'll find that the best effect is achieved by adding to line 10 your own micro's commands for setting the screen and border colour to white. John Ransley.

Modems — the whys and wherefores

A MODEM is one of the most worthwhile add-ons you can have for your computer. And with prices starting now at just a few tens of pounds, it can also be one of the cheapest.

With a modem you can exchange software with friends over the phone, dial up commercial megastores such as Prestel or Knowledge Index, or explore the expanding network of privately-run computer bulletin boards.

"Modem" is simply a contraction of modulator-demodulator: it's a two-way converter which translates data on your computer into audible tones suitable for sending along a telephone line — and vice versa.

In the phone line, each bit is represented by a high or low tone, depending on whether it's a 0 or a 1. Since only one bit can be sent at a time, data must be offered to the modem in serial

form. So you can't plug in to an ordinary modem unless your computer has a serial port. However, for many popular computers you can get special interfaces or communications packs which take care of the problem.

Among the cheaper modems are the best known as acoustic couplers. These have rubber cups into which you press your telephone handset when you hear the distant computer answer your call.

Unfortunately, acoustic couplers tend to pick up room noise, which can corrupt the data. So unless portability matters, you may prefer the more reliable direct-connect modem, which plugs into a standard telephone socket. If you haven't got these at home, British Telecom can fit them.

In choosing a modem, decide first which services you're interested in. Several different signalling standards

— or tone combinations — are in use, and you can either pick a modem to match or pay more to have a multi-standard modem.

Perhaps the convenience standard now is the vmodem format used by Proseal, which sends data to you at 1300 baud and expects your replies at 75 baud. The figures denote the speed of transmission: in this context, you can take them to mean bits per second.

Each byte you send less to be gobbled up with start and stop bits, making up 10 bits or so altogether. So even 75 baud works out a lot faster than you can type. Some bulletin boards today accept 1200/75 tones, but more often use the 300/300 baud standard — often referred to in technical jargon as V.21, the vmodem standard is V.22.

To use a modem, you need communications software. Its basic function is to re-route the data paths in your computer: characters from the keyboard must be diverted to the serial port, characters received from the modem must be sent to the screen.

Details of vmodem packages for a wide range of home and business micros are available from Microcent 800, Durrant House, 8 Herbel Hill, London EC1R 5EJ, telephone 01-278 5143.

Richard Lambley



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Spectrum
£14.95

Nidd Valley Micro

Two joystick interfaces are available, one which uses the Kempston protocol, and, for ten pounds more, a software programmable interface. Both these devices incorporate the company's patented "elomo" slow motion device, which allows you to play game at any speed

The Connection

Printer interface
Commodore
£79.95
Tyniac

Rather on the steep side, this interface plugs into the serial port, and allows the Commodore to be interfaced with any parallel computer. Different versions are available to cope with the graphics commands of various printers. The company claims that the interface is compatible with all software that expects a Commodore printer to be connected. Tel 021 327 8637.

Tape care kit

Global software
Various
£9.95

Two parts to this kit, azimuth alignment and head cleaner/demagnetizer. The azimuth tape constantly monitors the number of errors detected while the tape is running, so alignment occurs when you get fewest errors. Cleaner is of the usual fabric type. A promising start from this new software company Tel 01-228 6750.

Azimuth head alignment

Interceptor
Amstrad 464
£8.99

Following up their successful alignment tape for the C64, Interceptor are going for the Amstrad. An invaluable device, as so many "faulty" commercial tapes turn out to merely have alignment problems.

HARDWARE

Dot Matrix Printers

■ Star
■ £259 upwards

SAY THE WORD "printer" to the average home computer user, and the chances are he'll think of Epson, for so long the dominant force in the printer market. With this new range of printers, Star hope to make some kind of inroad into this market.

The range consists of three dot matrix printers aimed at the home user; the SG10 at £259, the SD10 at £389 and the SG15 also at £389. They are either Epson or IBM compatible, and offer an attractive, near letter quality font and a removable tractor unit. The DIP switches for selecting character sets etc. are easy to get at, usually on the left hand side, a major improvement over Epson's hiding them away inside. In the software, Star have come up with a neat idea, you can define a printer macro, once you define a series of often used commands, you can execute them by just sending the macro command. Perhaps this might have been more useful if several macros could have been defined. The SG and SD10 printers are both capable with speeds of 120 and 160 cps respectively and 24 (just over half a page) buffers as standard, expandable to 4k. The SG15 is 136 columns, at



Star printers.

120 cps and has a 16k buffer as standard. The SD10 uses a ribbon cartridge, the SG's, typewriter style ribbon.

So how do they compare? Well, in use, they seem rugged and reliable. None looks very reasonable, the paper feed reliable and precise. The only

slight quibbles are that the paper guides are a bit clumsy and the paper runs off in a long way from the print head, which means after doing a form feed after printing your document, you've still got to move the paper by hand before tearing it off. Certainly anyone looking at a printer in this sort of price range should carefully consider this branch.

Valiant Turtle

■ Spectrum/SBC/IBM 64
■ Valiant Designs
■ £215 for home users, £201 for schools

THERE ARE at least half a dozen different makes of turtle on the market but Valiant Design's product has already established itself as a rather superior turtle. Primarily intended for use in schools, it has two features that make it especially attractive to children. First it looks more turtle-like than most of its competitors. As well as legs, a shell, and a head, it even has a pair of red LEDs for eyes.

Second, it is not hampered by wires and cables but can roam free under the remote control of an infra-red transmitter. This device connects to your macro by either a serial or parallel lead, and gives the turtle a range of up to six metres. Power is provided by six alkaline batteries.

On top of this the turtle appears to be both robust and accurate; sufficiently accurate in fact to double up as a simple plottter. Its main use, however, will be to create turtle graphics in conjunction with Logo. Although the turtle pack does not include Logo it supports most versions of the language currently available. For more details ring Valiant Designs Ltd, 01 726 3947/527 1351



Valiant turtle

Interface III

■ Spectrum
■ Evesham Micro
■ £39.95

IT HAD TO come, the ultimate copier against which there seems little possibility of protection. But of course, you would only use it for copying your own software to Microdrive wouldn't you?

Hardly elegant, this unit uses the sledgehammer approach to cracking the art of software protection. After

you have loaded in the game, you simply hit a button on the unit, which plugs into the back of the Spectrum, and it simply dumps the entire contents of Ram onto the cassette port.

It also gives you the option of loading the screen display (important if machine code has been hidden in the screen area). Skipping this will mean that the program will take up about 5 sectors, so you can get two games onto one cartridge. The obvious disadvantage is that no matter how short the program is it will take up about the same amount of space.



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Star★ chart

On-Court Tennis

IBM-64
Activision
Tennis simulation
£10.99

Good quality simulation — as with the quarter backs in this company's football game, the tennis players have individual personalities, so Ivan Messer has a great serve and plenty of endurance, but Jimmy Orr sometimes wears a bit thin.

Didn't actually throw his racket at anyone while I was playing. You can select surfaces to play on.

On-Field Football

IBM-64
Activision
US football simulation
£10.99

At first glance this looks like a game of table football — same overhead view. But this game has all the jargon and complexity of the real thing, without the popcorn and the cheerleaders. You choose your starting quarterback, wide receiver, and tight end to fine tune your offensive strategy. You can even bring in substitutes. If you don't understand what all this means, then buy this game and catch up with Nicky Horne.

Quackshot

Spectrum
Creative Sparks
Arcade adventure
£2.95

No prizes for innovation, but value for money at the Sparkies economy price. A Tutankhamnesque maze game in which you, nightwatchman in the Acme Clockwork Toy Factory, are confronted by rampaging clockwork ducks. Armed with duckbuster bombs and stun gun you must fight them and the green snakes off. As with Tutankhamun you have to collect keys to move between levels.

SOFTWARE

The Artist

■ Spectrum
■ Softlok
■ Graphics utility
■ £12.95

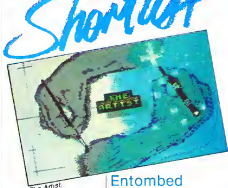
SELL YOUR Macintosh. That's what ex-Volvo assembly line worker turned full-time programmer Bo Langeberg suggests people will be able to do once they've loaded his new program onto a Spectrum.

There are even plans afoot to market this program with a mouse for the Spectrum. But at the moment you have to get by with five fingers to move the cursor. When the program boots you are confronted with an empty screen and two flashing cursors, one square, one cross-shaped.

You can get straight into some sort of Mac type painting by selecting a paint-brush and a brush pattern. At the base of the screen you have a choice of eight special commands — apart from brush and brush pattern these include a text option, a view command which shows you the whole screen without the commands, a move option which enables you to raise the screen so you can work on the base of the picture but still see the commands, a clear-screen option, a storage and a character creation option.

The reason you need five fingers is that apart from the directional controls of the brush you need to keep your thumb on the C key which sets the glyphs on the screen.

By pressing the symbol shift key you can move between two sets of other commands, pixel setting commands and colour setting commands. The pixel command section has some very powerful commands. You can enlarge



The Artist



Entombed

sections of the screen. You have instantaneous box and circle commands.

This section also has an overlay command which is comparable to placing a plastic sheet on top of a picture and copying it.

The colour commands open up a window around the cursor and the cross. Inside it, ink, paper brightness and flash can be set separately. **Paul Bond**

Elidon

■ IBM-64
■ Orypheus
■ Arcade adventure
■ £7.99

PLENTY of whimsy in the software market this month. We are treated to a trip to fairyland in Elidon. The beautiful graphics depict a luscious flower fairy as she tries to collect seven bottles of magic potion followed by pouring the bottles on to magic flowers in order to revive the magic garden to its former glory.

On her way she is hindered by tree-spirits, flutes, strange bundles of energy and cone darkened rooms peopled by things with glowing eyes. At first, a leaf, a crumb — any of these will help her ward off the unwelcome attention of the evil spirits. There are also lucky horseshoes to be found for bonus points. But do not pick up the ones which are upside



Elidon

down, for of course all the luck will have drained out of them and they will kill you.

It's possible to pick up a torch to guide the fairy through the darkened rooms and she needs all the help she can get for her VSTOL capability is easily upset by the slightest bump. It is possible to get her to hover by judicious use of the fire button.

There are also fireflies which can only be persuaded by the aid of a horn or a set of pan pipes.

And in this exciting Ultimecque game, your little fairy is going to need all the help that she can get. **Paul Bond**

Entombed

■ C64
■ Ultimate
■ Arcade
■ £7.95

THERE IS ALWAYS a bulk of expectation whenever a new Ultimecque title comes along. With a string of hits like Kingtides, Underworld and Alien 8 under their belt, we've come to expect something rather special from them. Entombed is set in Egypt, where our intrepid explorer, Sir Arthur Pendragon, is entombed beneath the Sphinx, searching for the scrolls which will help him get out of this tricky spot.

The screen display shows a Scratch on the wall's view of Sir Arthur wandering about the corridors. There are two windows of screens, scrolling, maze-like corridors and rooms where the various objects of your quest lie. The walls of the corridors are usually dense, covered in hieroglyphics. Apart from the scrolls, there are two objects you collect of more immediate value, a whip and a torch.

The problem is, the whole thing is rather sterile and predictable. In the corridors, you are constantly being tormented by things materialising and attacking you as you try to map out the maze. The rooms are too small to pose an interesting challenge like Mazes, Mummies and Monks, and the solution is normally amazingly trivial. Nothing constructive in the way of hidden clues is done with the hieroglyphics, the mummies in the corridors are just plain irritating and time consuming.

A pity, but not really up to the high standards we have come to expect. This game was actually written by a bunch called ACS and completed under the Ultimecque label, they would do better to stick to the Spectrum and their in-house programmers.

Lee Padden

(continued on page 28)



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Star chart

Flip!

BBC
Strategy word game
Acorn
£7.95

J & S Bach meets Ghostbusters, Mozart clashes with Teddybears! Picnic in Ikon's Palmenham-cum-word game, classical compositions mix with modern classics and classy graphics.

To score points you have to flip over the boxes to reveal matching pairs of graphics — Pac-Man, a Space Invader and a teddy bear to name but three of the 15 odd characters on the 4 by 10 grid.

As each box flips over you see the animated graphic and hear a snatch of its theme tune, find its partner and you hear the rest of the musical phrase. Behind the correctly paired boxes are fragments of letters which go together to spell a word. That's the second part of the game.

It's a race to identify the hidden word. But in the two-player game rash guesses made too early only give points to your opponent.

Ghettoblaster

CBM-64
Virgin
Arcade adventure
£8.95

Rockin' Rodney — no relation to Rankin's Rodney in Taskmaster's Jammin' — has to shop for batteries and search for a tape to put in his FBR (lightfully big radio).

Then press F5 and you will hear the beat. The aim of the game is to successfully deliver 10 tapes to Intardine Records. Meantime he can press the firebutton and fire notes at people to make them listen up.

A good game with some humour — street names like Electric Avenue get in, as do hippy anomalies like the Doors' Moonlight Drive and Love Street. Bob Dylan gets most streets into this game.

(continued from page 27)

Charlie and the Chocolate Factory

Spectrum
HW MacGibbon
Arcade adventure
£9.95

JUST IMAGINE that! A whole day made in enormous chocolate factory! And not just any old enormous chocolate factory! No, it's Wonka's Factory, where they make marshmallows that taste of violets, and chewing gum that never loses its flavour.

This is the prize that Charlie Bucket wins when he finds a golden ticket in a Wonka's chocolate bar. And this is the plot of Roald Dahl's scrumptious book, *Charlie and the Chocolate Factory*. Now those lovely people at Hill MacGibbon have turned it into a yummy computer game.

The primary game is split into four sections based on the plight of individuals who fall foul of the Chocolate Factory in the best morose way Augustus Gloop whose face is like a monstrous ball of dough with two tiny current eyes peeping out, becomes a purple blob in one of the sweet machines. Depicted in a maze of pipelines on the Spectrum screen, you must move Charlie backwards and forwards at the base of the screen, turning pipes until Augustus is safely floated into a flask. Otherwise he emerges from an open pipe as a sticky cloud.

The next section has Violet Bouscage surrounded by bouncing blueberries. Basically a breakout style format you use keys 6, 7, 8 and 9 to move Violet around and get her shield to fend off the ferocious fruit. The idea is to bounce berries into a pacer, or else.

The fourth section confronts television addict Mike Teavee with TV cameras. Their deadly rays can only be counteracted by using Wonka bars.

In the third section Veruca Salt has enraged the squirrels in the nut room. They want to chuck her out with all the other rubbish. She tries to leave poison nuts in their path, but these fade away quickly.

A nice touch is that you can practice each section without having to play the whole game, but if you rescue Charlie's companions in the primary game, then you will be given the code you need to help Charlie find the six gold keys in the chocolate factory.

And this leads you to a whole new game on the flip-side of the cassette. This would seem to be a game in the style of *Magic Miner*, with 43 challenging rooms to explore, in order that Charlie can enter the Great Glass Lift.

Paul Bond.

SOFTWARE

Shortlist



Charlie and the Chocolate Factory.



Jonah Barrington's Squash.

Jonah Barrington's Squash

Spectrum
Simulation
New Generation Software
£7.95

JONAH BARRINGTON (he is a famous squash player) Squash can be played against another human, or against the computer.

There are four difficulty levels, just as there are four ball spot colours in squash, ranging from red (easy) to yellow (difficult). The screen display is split in two sections with a three-dimensional representation of the game on the left hand side of the screen.

Hitting the fire button makes your player do a forehand or a backhand stroke, depending on the position of the ball when the button is pressed. So be careful! Turning you can alter the angle at which the ball leaves the racket.

Paul Bond



Web Dimension.

Web Dimension

Commodore 64
Ecological game
£10.99

THE SCREEN DISPLAY shows a complex section of a web. Life-forms drift aimlessly about the web. Pressing the fire button you must move your sprite — a musical note — along the webways, being careful not to touch the glowing ones.

Using the music you can freeze the life-forms at the nodes of the web. Once they are all frozen, the second stage starts.

In this stage you must stabilise the creatures, which are in the form of connecting stars at the transitional phase. Then you see the next stage of evolution.

Paul Bond.

A View To A Kill

CBM-64
Arcade adventure
Dorland
£10.99

THE GAME attempts to faithfully replicate three major action sequences from the movie.

The top half of the screen gives you a three-dimensional view of a Monster Maze of the woods. The lower half is an over head map view of Faria. A tracking bleeper indicates proximity of target.

Near, Bond's girlfriend who has the unlikely name of Stacy is trapped in a lift. Zorn has torched the building.

Essentially a platform game, the programmers have included a rather ingenious lockdown facility in the third stage.

Paul Bond

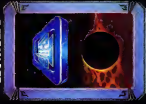
(continued on page 31)

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COMMODORE 64



COMMODORE 64



48K SINCLAIR SPECTRUM



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Star★ chart

Beeline

BBC
Riviera
£5.50
Maze game

★★★
Hank is a blue bee who explodes when he gets angry or tired. Your mission is to guide him to his beehive. Watch out for energy-sapping foodstuffs, spiders, faces, insecticide cans and the lizard's tongue.

Meanwhile, collect pollen grains, flowers, apples, honey pots and bowls of water.

Bulge

Spectrum/CBM-64
Lothlorien/ASP
£9.95
Wargame

★★★
After the bouquets last month for Amhem from OGS, it's time for the brickbats. To say that this is an improvement on Lothlorien's previous effort, *Panzer Attack*, would be true but would be no recommendation. It is in real time, and as the German commander, you simply haven't got time to issue all the orders you need to. As the game progresses and units get spread far and wide, you spend most of your time chasing round the map after errant units. Any bulge game which doesn't feature roads is doomed to failure.

Wetzone

BBC
Everss Software
£6.95
Shoot 'em-up

★
An engaging little whimsy from the house set up by imagine renegade Bruce Everss. Lots of different things to shoot at and every so often a UFO whizzes across the screen. If you hit it you score extra points. Sounds familiar? It did to us. We conclude that Bruce is re-examining his roots rather like Eric Clapton returning to the blues, or Working Week re-assessing jazz.

(continued from page 29)

Contraption

■ BBC
■ Platform
■ Icon Software
■ £8.95

★★★
Gamers programmers — or designers as they now like to be called — sometimes complain that reviewers do not play their games long enough to do them justice. Helen and David Mann, the authors of Icon's *Contraption*, need have no such fears between them. Your Computer's games reviewers have racked up hours of playing time on this one. The game has inspired seasoned reviewers — veterans of scores of platform campaigns — to rise from their desks clamouring to be let in the keyboard.

As far as the plot is concerned the game is fairly conventional. You have to jump, bounce and scramble your way through 10 screens, picking up apples and avoiding such perils as floating bombs and toxic pheroms. But the course in each screen is particularly well constructed, and pitched at just about the right level of difficulty. At first sight it seems that you will never reach that vital ledge, or catch a lift from that floating coffee table. But once completed each screen is plain sailing the next time round.

However what really marks this platform game out as special is the superb use it makes of Mode 1 graphics. Adopting the Pink technique of outlining figures in black allows the designers to show all sorts of pleasingly inventive details which make most Mode 2 games look distinctly crude in comparison. Pipes actually look three-dimensional, bouncing valves gleam, and your little man is a real character study — a teenage building odd timer clad in red Mao jacket which admirably sets off his tuft of ginger hair.

Simon Beesley

Combat Leader

■ CBM-64
■ Wargame
■ U.S. Gold
■ £9.95/£4.95

★★★
COMPUTER wargames are big news in the states, andSSI are the big name. This offering from them, via US Gold, puts you in command of a company of mixed tanks and infantry, against a similar force commanded by the computer. There are seven different scenarios available, giving you a range of objectives, or you can choose a roll-your-own option where you can pick the forces you and the computer will control and the objectives. This option also allows you to specify the characteristics the vehicles will have, and to help you, some historical data is provided to allow you to pit Sherman against Tigers, or even, if you have a taste for the bizarre, Marauders against Sheridans.

There are eight different maps of terrain, most thickly wooded, with the

SOFTWARE Shortlist



Contraption.



odd ball. A river with a bridge might have been nice, but you can't have everything.

The game plays quite smoothly. You issue orders to units by a combination of keyboard and joystick. The unit's response is then displayed. Units report their position, and that of any enemy units you see.

The game seems rather weighted against the poor bloody infantry, whom you would expect to do pretty well in this sort of terrain. Despite being equipped with anti-tank weapons, they tend to come off second best.

Tactics are minimal, advance under cover until you find the enemy, then fire like mad until one of you is dead. However, interest is maintained by the wide variety of missions you can try and you can have different mixes of forces, and different types.

Certainly a lot less trouble than setting up a miniature game.

A good first attempt in a difficult field where everybody has their own theory about what constitutes "realism" and historical accuracy. *Lee Paddon*

Chopper

■ Creative Sparks
■ CBM-64
■ Scramble-type
■ £2.50

★★★

WORTH every penny of £2.50 this is another example of the Spazkian philosophy: "if you can't beat 'em, undercut 'em".

Instead of a spacecraft you fly a helicopter against oncoming hordes of hostile roverscraft. The angry buzzing of a massed helicopter squadron is faithfully replicated by the 64 and is guaranteed to make the neighbours think you are shooting the sequel to *Apocalypse Now* in your living room. The drawback is that you are fixed to the right hand side of the screen and can only move up and down. You can't shoot when you're moving and vice versa.

On the second screen, which you achieve after a tricky refuelling sequence at which you have to render

(continued on page 33)

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COMMODORE64

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Spectrum Shops and all good software dealers.

ocean

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Manchester - M2 5NS
Telephone 061 832 6633 - Telex 669977 Oceans G

Star chart

Baseball

GBA
Activision
Sport
£10.99

★ ★
A poor copy of the Imagine Baseball game reviewed a couple of months ago. You get to field and bat, when fielding you choose the ball you pitch and manipulate the fielders. As batsman, you choose when, and if, to swipe the ball. Only one view is given, from the perspective of the spectator, with none of the nice touches which made the Imagine version bareable, mind you, at least we are spared the ra-ra girls at half time.

Chicane

BBC
Kempston
£7.95
Racing game

★ ★
With absolutely phenomenal timing, Kempston launch a racing game hot on the heels of Acornsoft's "Revs". Unfortunately, this game is rather left in the pits with a dead engine compared to Revs. As a game, it is quite good, but a simulation it isn't. Steering, throttle, break and gear changes are all included. There are six different circuits to race round.

Theatre Europe

PSS
GBA
£9.95
Wargame

★ ★ ★
Following on from their Midway game, this is set in the near future, when the treacherous Russians come charging over the North German Plain, bent on bringing the peace-loving west under their ruthless iron heel.

Behind this distasteful scenario is an even more distasteful game. Technically very well executed, the conventional battle is a dull slugging match.

(continued from page 31)

vous with a stratanerker, you are plunged headlong into the usual surreal mixture of balloons, ducks and what-have-you so beloved of the true arcade graphic craftsmen. The ducks fly past in strict formation — the more ducks pass, the more points you get. But you will probably bend your rotors on an airship first.

If you survive to screen three, you will discover the purpose of your mission, which is to chuck bombs down horizontal shafts to destroy the enemy base in the time-honoured way. The enemy whirlybirds conceive to get in your way and are practically invulnerable on this screen. If you like clenching your teeth and screaming, then this is the game for you. **Paul Bond**

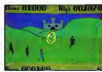
Taskmaster

■ GBM-84
■ Shoot-'em-adventure
■ Creative Sparks
■ £2.50

★ ★ ★
WITH excellent three-dimensional graphics and seven screens, this looks like the sort of game that US Gold was marketing for £14.95 a year ago. Maybe the programmers could have done a little more with the sound facility, but for £2.50 this example of the new Sparklers range from Creative Sparks is a good value.

As the sun goes down on the first screen, the valley in front of the castle darkens and the zombies troop on the football supporters aimlessly wandering about and treading on you if you get on their way. Your man is armed with darts and you must keep blasting if you hope to see the second screen. This is the worst of Debris Wood who appears at random and launches heat-seeking spells at you. Getting through this screen is more a matter of luck than good judgement — then you find yourself outside a cave in Vampire Mountain. You have to pick up four sacred stones and since your man is getting a big tired now he seems to walk more slowly and weave about. This is not good because Woodacking has some feroic form from the mouth of the cave.

On the next screen our man is evidently getting into ancient history, as we find him by a stone circle. But the guardians of this creepy crumkch are the Devil Wenchippers of the Temple of Demens — a bunch of trigger-happy mad monks. Understood — our hero winds up at the cemetery being assailed by ghouls. By this time I was so shellshocked I forgot to notice what the screens were actually called. **Paul Bond**



Taskmaster

SOFTWARE Shortlist



Magic Mushrooms

Magic Mushrooms

■ BBC
■ Platform game
■ Acornsoft
■ £12.95

★ ★ ★
IN YOUR HEARTY stinks and a drowsy mushroom steals over you as the mention of platform games Magic Mushrooms might be the antidote. It is a game in two parts, both a standard maze nine screen platformer and DIY platform construction kit. The latter is a question are what you have to pick up along the way.

The ready-made screens are frustratingly difficult if not impossible, but at the point at which you are about to give up in despair you can press

Escape — whereupon you move to the Edit screen. Along the top there is a menu of 15 items, among them escalators, monomers, crumbling and firm platforms, trampolines, and slides — all the items, in fact, that you would expect to find in a well stocked platform game.

It is now a simple matter to take out a troublesome monster or add a new stairway. Alternatively, you can give your imagination free rein by scrubbing out of the steady-made screens and building a new one. Either way, you can then save your creation.

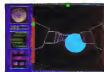
If you are the one setting the traps and obstacles they probably will not present you with much of a challenge, although they may to others. But the real interest lies simply in designing new screens, an activity which turns out to be even more compelling than playing the game itself. **Peter Connor**

Gyron

■ Spectrum 48K
■ Firebird
■ Maze
■ £9.95

★ ★ ★
AT FIRST you might look on this game as a maze game crossed with a shoot-'em-up, with some nice graphics. But this would be to dismiss a game which gradually grows on you. It is more reminiscent of Rubik's Cube than a run of the mill maze game.

The first thing that strikes you is the graphics. You pilot a ball, or Hedron, around a maze. The maze scrolls smoothly past you as you move down the three-dimensional trenches. Control is achieved with cursor keys or joystick. Moving the joystick to one side or the other will move the Hedron across the trench, and, if opposite the



Gyron

appearing of a side trench, the Gyron will turn the corner.

There are a number of spheres rolling around the place according to predetermined patterns. These, needless to say are deadly. Then there are the towers, these are a different kettle of fish altogether. These are orientated in a particular direction, which you get from a small radar map of the neighbourhood. If you roll in front of these, you get shot. **Lee Paddon**

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NEWS o a e o r s s u t t t t h h h h

The crystal ball

Incentive Software have released their popular Ket trilogy (Mountains of Ket, Temple of Vran and Final Mission) for Dragon owners. It comes on one cassette and costs £9.95. Bored Of The Rings is an excellent parody adventure available on Microdrive or cassette for Spectrum owners. Mail order only from Delta 4 Software (0493 5800).

A helping hand

Fulvio Cerasia of Rome is a great fan of English adventures. He had a spot of trouble with two of Scott Adams'.

In Spider-man Can't get the bio-gen LIAH MORF MEGO IBTA BEWT OOHs Electro a shocking problem? ORTC ELEG NITT IHER OFER SMRA SKC OROT COOB ARG In Sorcerer of Glamorgue Castle Can't open the book? TFOL EHTM ORFT IPOR D Battlement bn-can elusive? KGR BWDR HTNE HTLL EPSN AEDT SAC Gary Blunder of Ongar can't shift the bear in Adventureland RAER EHT ALLE YTSU J In Sutton Coldfield, M Poynton is wrestling with Zork 1: In the dark in the Drafty Room? MOOR TFAH SMOR FTEK SARN ISTC EJBQ REWO L From Warrington, Andrew Parker is adrift in Zork 2 What goes on the stands on the Wizard's workbench? SERE HPSS SAL DERU QLOC EHT RT Yours in adventure adventure, Hugo North

QUEST *Corner*

Our man with the brass lamp and the key to a thousand mysteries sheds light on new adventure programs. Lost? Never fear, Hugo North is here.

Key of Hope

- Spectrum 48K
- Games Workshop
- £7.95

FOLLOWING ON from the excellent Tower of Despair comes this latest atmospheric two-part text and graphics adventure from Games Workshop.

The adventure features over 400 locations — though only some are illustrated — and has beautifully designed minicomp-style text.

The White Goddess of Truth has requested your aid in the battle against the great Malnor. You must collect the scattered pieces of the Key of Hope to defeat the Demonlord.

You begin, confused, at the ruins of Castle Asperit. Nearby is a plain ring, a spirited, snow-white stallion and a glimmering sunsteel sword. It's all too easy to get lost when you start to roam around but with luck you should find a talisman. Pity it's too hot to pick up, though.

You must find water quickly else your horses may soon be bleaching in the sun and the search for the key over before it has barely begun. Your quest is definitely not going to be easy.

As before, a rich plot, plenty of locations and puzzles and fantastic prose. Highly recommended.

Mindshadow

- Commodore 64
- Activision
- £79.99 — disc only

IN MINDSHADOW, your aim is to find out your lost identity by working your way through a series of situations. The game sports some pretty impressive graphics of the locations but the adventure itself turns out to be a little on the dull side.

The early part of the game is set on a desert island. A little exploring soon uncovers such things as an



abandoned hut, a wrecked boat, a cave and plenty of gnomes. As you quickly find, the only way to get off the island is to hitch a lift on a passing ship. Unless you've got a sunshin' beam, the captain won't take you.

The adventure has a sophisticated command analyzer and a wide vocabulary. Help is available by calling on a giant condor (I can't think why who may assist you up to three times).

Not bad but at the price I can't see many people buying it.

Tyrann

- OrnelAtmos
- No Man's Land

CONFIRMING the popularity of the OrnelAtmos with the French, here comes a Dragons and Dragons type adventure imported from across the Channel.

Don't fret that you'll need GCE 'O' Level French to play the game — apart from a few system messages like "Un instant svp" and "Changement en cours" — Loading in progress, I presume — all text is in English.

The aim of the game is to guide a band of six characters through a large, monster-infested labyrinth. Your ultimate mission is left unstated. At the start of the game, you select and name your group from six types: each character can be a warrior, magician, thief or druid. Their quality of their abilities —

strength, IQ, dexterity, constitution and wealth — is determined randomly by the program.

Before you enter the labyrinth and whenever you return from the depths, you may visit the Emporium. Provided you have sufficient money, you can equip your party with various items such as weapons, armour, potions, parchments and spell books. Included in the list of 25 objects on offer are a white mouse and a baby dragon.

While above ground, you may also sell, swap or leave items and pay a visit to the Great Alchemist — who is excellent at First Aid.

Once in the maze, the display shows a stylised 3D view of the path ahead. Nothing visually exciting about this, just the usual perspective line drawings of walls and doors. As you move left, right or forward, the picture is updated.

The party may elect to camp and in so doing you can choose to catch 40 winks or inspect the current status of any member.

Apart from strolling round the maze, the only other activity is fighting. When you meet a group of monsters — they usually come in groups and are only shown by name, not pictures — each character is given the option of parrying, fighting, casting a spell or retreating for their life. Each round of the battle is then described. When all your band is killed, the game is over — but you can bring all of them back to life and start again.

Use of sound and graphics is minimal and the game context and format is hardly original.

BEATING THE YANKS AT THEIR OWN GAME

Mark Shepherd, in beer-swilling T-shirt, and Mike Redman of SCR adventures

James Hartley discovers that the British are doing well in the latest software war against the U.S.A.

THERE'S A MAN dressed up as a werewolf in one of Infocom's latest adventures. You might bump into him in the kitchen, or find him nodding up to you by the fireplace in the living room for a chat. If he does, you might discover that he is married to that charming lady you met only a few minutes earlier at this high-society fancy dress ball. That lady is now lying dead in one of the adjoining rooms, strangled by the larist from your costume and victim of a hideous crime in which you are the prime suspect.

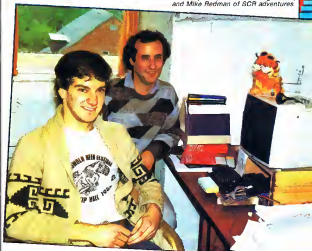
Suspect, as the game is called, boasts a whole crowd of characters like the werewolf, most of whom you can communicate with in one way or another, and all of whom seem quite capable of going about their business quite independently of you, the player. The game is typical of a whole new generation of text-only adventures that are beginning to make some of our British adventures look pretty silly. If you've been introduced to Infocom — and it'll cost you upwards of £60 plus the disc drive to run the program on — then you'll understand immediately why Douglas Adams worked with Infocom on his excellent computer version of *Hitch-Hiker's Guide to the Galaxy*.

Different in a year or two

The reasons why Adams worked with Infocom are fairly obvious — a top-class software house working in an enormous domestic market — but in a year or two things will be quite different. British adventure programmers are fighting back and are now racing to develop new game systems that could end up making even Infocom look pale by comparison.

The main problem to date has been the hardware. Here in Britain hardly anybody has disc drives that can provide the sort of data storage needed for really complex games, and, unlike in the U.S.A., machines with larger memories, like the IBM, are scarcely thought of as *personal* computers. But, paradoxically, it's limitations like these that are now providing the basis for a new push forward in British adventure software.

"It's been very frustrating," says Pete Austin of Level 9 — generally reckoned to be Britain's leading adventure software house, "but over



coming machine limitations has become a way of life for British programmers, and it's helped us to develop techniques that could be very important when we have machines with discs and larger memories."

Pete's brother, Michael, Nick — developing an entirely new adventure system that looks like giving the competition a good run for its money. In fact, he's already reached the point where he's no longer that impressed with Infocom.

"At the low programming level their games really aren't that clever. Their compression routines are virtually non-existent and I'm not at all impressed by the speed — especially on the Commodore. Our market here may be about two years behind, but as soon as discs become available, we'll be ready to make a huge leap forward."

Host of advanced features

The system that's being developed by Level 9 boasts a whole host of advanced features. First, a new compression system that uses a combination of stored dictionaries and character encoding — based on the frequency of different characters — makes possible a vocabulary of between one and two thousand words. Previously, adventurers have had to struggle with game with anything from 200

down to as little as 20 or 30 words.

Objects that you can manipulate during the game will no longer just be things you can pick up or drop — you'll be able to look inside them, or use them as containers to carry other objects from place to place, and of course there'll be plenty of characters to meet on the way.

"I'm trying to work towards a soap-opera type of game," says Pete, who tends to be responsible for the design of Level 9's games, "and I'm aiming to develop characters with whom the player can get emotionally involved. As memories get larger, there's no point in just adding more puzzles — you don't want people slaving away for more than a few weeks to solve a game. You're better off using the space for entertainment, and characters are a good way of doing it."

Although future Level 9 products will tend to get more and more sophisticated, the company is ensuring that programs don't become too slow and cumbersome. On the new Spectrum system that it is working with at the moment, the player can carry on entering commands while the graphics draw simultaneously. And where graphics are concerned, Pete sees new machines — like the new Atari range — as providing tremendous potential for the use of landscaping techniques, somewhat

similar to those pioneered by Mike Singleton in the very successful Lords of Midnight series.

Level 9 is perhaps the best known British adventure house, but it's not the only one to be hard at work on developing more powerful systems. One small company, which to date has produced only one game — *Castle Blackstar*, distributed by CDS — looks set to become a household name over the next couple of years with an adventure system that will certainly rival that of Infocom and could force Level 9 to look to its laurels. SCR Adventures is the brainchild of Mark Sheppard and Mike Redman, two enterprising 24-year-olds who graduated in Computer Engineering from the City University in London and are now hard at work on an adventure development system of truly epic proportions.

"Text is best"

"It's been so frustrating, having good ideas but not having the memory or the discs to produce them on," complains Mark Sheppard. "The computers in this country just haven't been up to it, but as soon as this country goes to disc we'll be ready to jump in." SCR's system has been developed using the language C, running under Unix, and although it's still early days, it already outperforms the system used by Infocom in the notorious Zork trilogy. Highly efficient compression systems and a very complex parser to interpret the users' inputs both work together in a framework that can cope with multiple interactive characters, container objects, and even moving vehicles for the player to drive from one location to another.

Unlike Level 9 and like Infocom, SCR is aiming at the text-only market. "Most adventure graphics just use the same basic forms over and over again," says Mark, "and what's the point of seeing the same tree in every location, even if it is a different size and in a different place. With text, you can have a different tree in each place." Always provided, of course, that the text can live up to what's expected of it but, judging from *Castle Blackstar*, its first release, SCR is quite capable of wielding the pen effectively, although both Mark and Mike seem rather hesitant to talk about *Blackstar*: "It's very cased now, and I don't like to be reminded of it," says Mark, although others obviously disagree — the game was recently voted one of the top 10 best adventures.

Some surprises

There are some surprises, too, to be found where new adventure systems are concerned. One company that isn't usually associated with adventures and which is keeping things very hush-hush is Mastertronic. It is hard at work on a system that comprises two basic modules, a database input/management system and control module to access the data and provide higher level game-play routines. Interestingly, the system has been developed using the Forth language.

Stephen Kirk of Mastertronic has nothing but praise for Forth. "We can have a library of primitives that access records, provide input/output, parsing, and so on. It's an extendable language and gives us a five-times saving in time over using assembly language." What's more, it enables them to develop software and

produce it simultaneously over a wide range of machines — essential in the British market where there are still substantial user-bases for what might normally be considered minority machines.

Adventure fans will doubtless be excited to learn that Mastertronic's new game is being designed by Sue Gazzard, who designed the very popular *Lords of Time* adventure for Level 9. It's also working, in conjunction with Roy Carnell, known to many adventurers as the man behind *The Wrath of Magna*, on an epic game that has been marketed by Mastertronic under the Mastervision label following the collapse of Carnell Software.

Mastertronic, however, is being careful not to leave cassette users behind in its search for bigger games. The company reckons that its system will be able to produce 250 location games plus graphics to run in Ram without discs, using only two separate loads from cassette — *Wrath of Magna* needed four separate loads.

Stephen Kirk reckons that their system will "just grow and grow. It'll give us a far greater diversity of input for our games, so we will be able to branch out into whole new areas, for example adapting ideas from books, films, and video, and accepting scripts from well-known writers" — like Douglas Adams, perhaps.



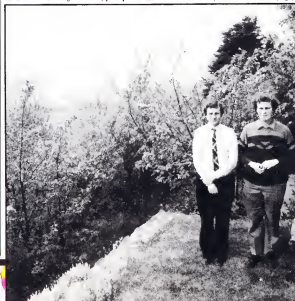
But the best news for the adventure player is yet to come. Although all the systems mentioned above will be used exclusively by the companies concerned to develop their own products — though perhaps from your ideas — there are also powerful programs to be released over the next year that will enable you to challenge Infocom at its own game!

"It's more complex"

You may well be familiar with the popular *Exploring Adventures* series of books, published by Duckworth for a wide range of machines. The system in these books was concerned with simple two word, verb-noun, Basic adventure programming, but now author Peter Gerrard is at work on an enhanced version which will, he hopes, be ready for release in September of this year.

"It's much more complex than the old system," says Peter, "and the majority of it is in machine code rather than Basic. The command parser is far more sophisticated and the location descriptions can be heavily compressed so you can fit more in." Peter also sees interactive characters as being very important to a good game. "If they work, they make it impossible to play the same game twice," he says, and he's currently working on

(continued on next page)



Red Moon



Level 9 Computing

ADVENTURE

Red Moon is Level 9's new release but don't read too much into the title even if Level 9 does share High Mocombe with a USAF bunker

Last, but not least, there's the famous, or infamous, Quill. Produced by Gilsoft, this adventure development system has already introduced thousands to the enjoyable art of adventure programming, and it now seems very likely that an enhanced version of the program could become available in the not-too-distant future. "We are interested in producing a more advanced Quill", says Tim Gilbert of Gilsoft. "So far I've definitely felt frustrated — people have relied far too much on cassettes but now, at last, disc systems are becoming more widespread, and with machines like the QL we can have networked games and multi-user adventures, though I have my doubts about the QL's speed capabilities for more than about three fully-interactive characters."

Developing the Quill and the Illustration graphics program for different machines is taking up a lot of Tim Gilbert's time at the moment, and he's understandably cagey about his plans for the future but, like Peter Gerrard, when he does come up with the goods, you can be sure that he won't be keeping it to himself.

(continued from previous page)

a game in conjunction with his brother Mike that has got him very excited. "The results have been better than either of us could have done on our own," and with any luck, using

Peter's new system, adventurers all across the country will soon be able to join in the fun. "After all," says Peter, "it seems silly to develop a system and then keep it all to yourself." If only everyone else for the same way

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FONT 484 is an easy-to-use program enabling you to design, edit and save your own characters and graphics for simple use in BASIC programs. There are 4 pre-designed fonts and sophisticated printer driving software which allows high-resolution screen dumps and laser writing on 10pin compatibles or the DMP1.

ULTRAKIT is the most powerful interactive toolkit yet for ZX BASIC. All the features you will ever need.

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TRACE UPDATE VARIABLES WARN
CRUNCH CRUNCH REMKIL PACKER
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loader card.

DEVPAK is a complete machine code development package. It is the second one that many people buy because after the first one they know what to look for. The front panel debugger is the only way to really see programs in action and assembly from multiple source files is fast enough to satisfy its most demanding users — ourselves.

Pascal is a valuable educational and development tool, as well as running typically 40 times faster than a BASIC equivalent. Our compiler is an almost full implementation which compiles direct to machine code (no slow Pcode). Multiple file inclusion allows very large programs to be compiled.

C combines high-level structuring with direct control over the machine at its compiled speed. Our compiler is now available from good retailers and has proved extremely popular. It supports all statement types (plus inline code) and over 40 operators, whilst due to unassigned and conditional using pointers, arrays, structures, unions, functions, and typedef are all allowed data types. External and static variables can have initialisers, whilst auto variables support recursion. There are six preprocessor directives and over 60 library functions with a selective inclusion scheme.

MON QL is our latest product and our first on the QL. It was written by Andy Pennell, who has a great deal of experience on the QL. It is written in style to the well-known MON front panel as DEVPAK and includes additional like job control and multi-language support. It also contains system exceptions and includes files for QDOS.

Product Price Table

	Pascal £	DEVPAK £	C £	ULTRAKIT £	FONT 484 £
ZX Spectrum	25.00	19.00	25.00	9.45	
Amstrad CPC464	20.00	21.00			7.95
MSX	20.00	19.00			
CPM-80	30.00	30.00			
Sharp	30.00	25.00			
Sinclair QL		19.00 (MON QL)			

All prices are for cassette versions (except CPM and QL) and include VAT and p&p in the UK. Please contact us for export orders, disc formats or detailed technical information packs. All products are available by mail order please send a cheque or Postal Order. Sorry, we do not accept credit cards.

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by Ian R. Sinclair

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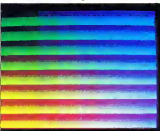
DR Logo will be built in on Ram



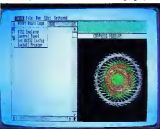
A cat for the mouse — hi-res graphics.



Gem — controlling the WIMP environment.



Op Art on the ST and below Logo graphics



SUPERMICROS

FEW COMPUTERS HAVE generated as much interest as Atari's ST range, first announced in January. The 130ST, in particular, promised most of the features the average home computer owner would want to see in an ideal machine: 128K Ram, a powerful 16-bit processor, tremendous high-res graphics, an extensive array of ports, a high capacity disc drive, a Modem interface, and a mouse — at an unprecedentedly low price; not much more than the cost of a BBC. And to clinch the matter the ST computers run Gem, Digital Research's Graphics Environment Manager.

Gem is an operating system which gives the STs all the capabilities of Apple's Macintosh — icons, windows and pull-down menus under the control of a mouse. Unlike the Macintosh system, Gem has the advantage of being able to use colour and is already running on a number of other computers such as the IBM PC and the Apricot. Software written for other machines can be converted to the Atari fairly easily.

For the moment, however, the 130ST will not be sold in this country, and the machine we looked at, the 520ST, will cost somewhere between £750 and £800. This price may seem to be way outside the budget of most home users but it includes a 500K 3.5in. disc drive, a hi-res monochrome monitor, 512K Ram, and a mouse. Along with the hardware there is an impressive list of software: TOS — the Transmille Operating System, Gem, Gem Desktop, Gem Write, Gem Paint, DR Logo and DR Personal Basic.

With the exception of TOS these programs have been bought under license from Digital Research. But the problem of tailoring them to fit the ST seems to be taking longer than Atari anticipated. DR Basic, for example, which is being converted to give the user access to Gem's graphics, is not yet running. On the review unit the software was loaded in from disc. When the 520ST appears in the shops in September the software will be held in 192K Ram.

The computer and the peripherals have a common styling which looks businesslike, but tends to take up a lot of desk space. The keyboard unit is large — the price you have to pay for a nicely-spaced keyboard layout. The quality of construction of the computer and peripherals is good with no signs of patching.

Inside, the processor is a Motorola MC-68000 running at 8MHz and capable of addressing 16Mbytes of contiguous Ram. This is perhaps the best of the 16-bit devices, but do not make the mistake of thinking that 512K Ram is equivalent to 512K in an eight-bit processor environment. Code is stored as a minimum of two bytes — a word — and invariably a lot more memory space will be used. The overall effect will be to gobble up memory, and there is no means of externally extending the 512K Ram. For those readers used to eight-bit machine-code programming, a ratio of 75 percent seems about the effective memory for comparable programs.

The Atari ST contains the following peripheral support chips: a 6301 which scans



the keyboard, mouse and joystick ports, buffering the data in the keyboard queue; an MC-68901 which services communications and interrupts; a FD1772, floppy-disc controller supporting up to two drives; and the YA-2149, Yamaha's equivalent of the Texas AY-3812 sound chip. An MC-6580 provides the interface for the Modem functions and another MC-6580 provides the RS-232 interface.

In addition there are four special Atari ULAs which function as memory management, DMA, ancillary functions and graphics. There is no hardware character generator — it is all done in software. The memory chips consist of 16 256K Ram devices and six 32K Eproms.

The U.K. keyboard sports an extra key compared to the American computer. The left



ATARI 520 ST

Now Kathleen Peel has
seen the future of
microcomputing — but
does it work?

hand shift key has been split in two, to allow the $\&$ sign to be shift- $\&$ and hash to be repositioned. The keyboard consists of a 60-key typewriter-style portion, an eight-key cursor control portion, an 18-key numeric keypad and 10 function keys. The keyboard feel is uniform, consistent and eminently suitable for word processing activities.

There is no internal speaker and the sound is reproduced from the attached display unit speaker. Nor is there a battery back up to the internal clock which must be set at switch on to provide accurate date/time stamps to files.

The external connections are numerous and will meet most requirements, the only notable omission being the inability to add on more memory externally.

The peripheral ports include two joystick ports on the right-hand side, one configured for a mouse. On the back are a reset button, on/off button and power supply socket, Midi in, Midi out five-way D-in sockets, TV, monitor — composite and RGB — 25-way RS-232 socket, Centronics which also functions as an eight-bit bi-directional port, floppy disc controller, a 19-way D-shell direct memory access port that can be used for the attachment of a hard disc and a Rom expansion port on the side.

The Midi interface acts as a sequencer and can be used to perform step, time, note and trigger data entry. The Midi interface can also be used as a network link — as can the bi-directional Centronics port, the RS-232 and the hard disc port.

There are a number of high-level languages available — DR Logo, Forth, C, Assembler — but unfortunately the one I wanted to see was unavailable — DR personal Basic.

It seems strange to offer Logo at this level. Presumably Atari wants to attract educational users. My own view is that this and most other high-level languages are irrelevant to the real world: academics may favour the language but being an experienced Logo programmer will not earn you any credit with employers. Basic, by contrast, is a language that is likely to survive, and provides a useful general programming background; Cobol and Fortran are, likewise, still relevant for commercial and engineering applications; while C is the language

(continued on next page)

(continued from previous page)

for the future — most software tools, including Gem and CP/M 68K, seem to have been written in it.

The other software supplied with the ST includes Gem, Digital Research's integrated operating system. Gem provides an initial interface between the operator and the machine through icons, pictorial representations of facilities or devices the operator wishes to use. Move the cursor over a symbol of a dustbin to indicate that the current document is rubbish and no longer required, press the mouse trigger and its gone! Well it saves typing New.

Mouse action smooth

The Mouse action appears smooth and is placed over the icon and the trigger pressed to select an activity.

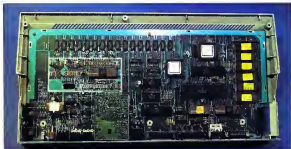
Gem Desktop provides the working shell that allows loading, copying and general house-keeping. Gem Writer is a word processor based on Volkswriter and Gem Painter, is a similar program to MacDraw.

There are three graphics modes, 320x200 in 16 colours, 640x200 in four colours, both from a palette of 512 colours and 640x400 monochrome. Although the windows and their contents were capable of being moved virtually instantaneously using the menu data buffer, there were times when listing text seemed relatively slow. This is probably caused by making calls serviced through multiple layers of operating systems.

The sound generator has one noise channel and three tone channels. Easy Basic access through a macro language similar to MSX machines, one of the few parts of the MSX specification that I like, is not available.

50 titles being developed

The number of applications that currently run under Gem is very small, but there are well over 50 titles being developed by U.K. software houses alone. Atari intends to keep software prices under \$100 for a single piece of software and hopes that \$50 will be nearer the norm. A Telex emulator is being developed and



The Opposition

QL, the QL has 128K RAM, costs \$600 and comes complete with adequate software. Adding a bit monitor and enough memory to reach 512K and takes you up to \$800. On that basis, it's not worth thinking about. The only reason for buying a QL is the \$400 entry price if you already have a monitor or TV and the 48-hour software support that comes with the machine, a very important item not to be underestimated. All software is likely to run in the 128K, and some good packages are beginning to appear.

Apple's Macintosh, at about twice the price and limited to black and white, is the



Take your pick: 5Mbyte or 1Mbyte

should soon provide the ST with yet another use.

Documentation for software developers from Digital Research appears to be comprehensive



Spot the Muir — a DIN's eye-view machine on the business side that the Atari ST is most likely to challenge.

IBM PC. The Atari ST has the ability to run in PC mode and use some PC data files. It is unlikely that PC DOS programs will run on the Atari.

Act Apricot F1E, at its current price of \$600 for a 16-bit 8086 computer, with 128K RAM, CP/M 86, Basic and a 315K formatted 3.5in. floppy disc, does seem rather good value when you consider the wealth of software available. The Apricot F1 is available for about £1,000 and has the considerable advantage of also running MS-DOS, 256K Ram, a 1Mbyte unformatted disc and a substantial set of software packages. Not quite as good a hardware specification.

Commodore's Amiga is the cloud on the ST's horizon and on a technical level, the only other reasonable alternative besides the Apricot.

and of high technical quality, hopefully forming a good platform on which to base the Atari manuals.

The Atari discs are 3.5in. Epson floppy drives. The SF354 gives 500K and the SF314, 1Mbyte unformatted storage. To load the TOS image file of 200K took approximately 35 seconds which is a very reasonable figure for low-cost drives.

Monitor display good

The monitor display quality was good, but was limited to 640x200 maximum by a protection circuit which is employed to prevent phosphor "burn-up" in low and medium resolution monitors caused by the higher frame rate used in high-resolution mode. One of the ST's unusual features is that it checks to see what sort of monitor is attached — RGB or composite video. It then selects the graphics mode appropriate to the monitor's resolution.

Gem provides an integrated operating system approach which is very successful in providing a simple entry to computing for the uninitiated. But at this level, it is the application packages that provide the user-friendly aspects of the program, the operating system itself ensuring a common approach. PC-DOS compatibility is really limited to data files only, it is unlikely that programs will actually run.

CONCLUSIONS

■ The software problems will be fixed as the computer is systematically debugged and there is no inherent problem with the hardware. All comments relate to Rom details but what should not be underestimated is the time it will take to fully debug the amount of software provided. It is not a three-month exercise as the cause of every obscure fault must be diagnosed and the cure tested to ensure that it does not have any effect on associated code.

■ The current market has been filled by products that were used either to:

- a) Teach someone about computing.
- b) An upgrade.
- c) For a specific applications games, or business packages. Further market penetration is

becoming increasingly more difficult for new products as they vie for new market sectors. Obviously there is a huge market out there that I believe is extremely price-sensitive, and E800 is getting very close to the limit for a budget-priced serious micro.

■ The 520ST is technically excellent. I understand why the 520ST was the first device to appear in the States where disposable income is higher, but in the U.K., the machine that I feel could have made Atari a fortune is the 130ST, provided it ever makes an appearance and at its launch price.

■ The 520ST hardware is the new standard by which others will be judged. Do not worry too much about the software problems. They may take time to debug but when they have been, this will be a very good computer.



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ITS

[illegible]

Elsie Dee takes a byte or two out of the new Apricot FIE and likes what she tastes.

ACT DOES NOT MAKE home computers. But the latest price cut on the Apricot FIE has sent it storming down into BBC territory with a specification of 128K Ram, 16-bit 8086 central processor and built in 320K Sony 3.5 in. disc drive for £685 including VAT. And just in case Acorn does not get the message ACT is also launching a £90 B-Tron program which will allow the FIE to run most BBC Basic programs.

Unlike the expanded home macros usually found in this price range the FIE is a cut down version of the FI business micro which uses a mouse and seems as a user-friendly alternative to the keyboard. You can expand the E up to FI spec including a mouse but even in standard form the E comes with a full colour icon display. The machine looks professional with its separate keyboard and slimline shoebox sized processor unit cum disc drive which doubles up as a base for the monitor, although it also has a video output to an ordinary TV.

The battery-powered keyboard is a little too like the QL's with the keys cut from a single slice of plastic rather than individually moulded. Batteries are needed because the FIE has a "look no strings" TV-remote-controller style infra red link to the main processor box. This has the advantage over the usual curly telephone cable connection that you don't feel like an elastic band is trying to tug the keyboard out of your hands, but the disadvantage is that unless you keep it lined up with the processor you can lose keystrokes. As an afterthought to try to overcome this ACT has added a light pipe which restores the physical connection between keyboard and shoebox — unfortunately the pipe is not as well made as the rest of the machine and ours broke in normal use.

The FIE comes with ACT's own icon-driven interface called Activity. Getting started couldn't be simpler — you just switch on and feed in the demonstration disc which introduces you to icons. These are a series of diagrammatic representations along the bottom of the screen labelled Activity, Files, Utilities, Disk, Help, and Exit. You just use the cursor keys to position an on-screen arrow over your choice



and then use the Enter and Return keys to call it up.

This Apricot also comes with MS-Dos 6 the IBM PC style operating system used in most business micros — although the FIE is not IBM compatible. Also supplied on disc with the FIE is GW-Basic, Diary and Sketch programs.

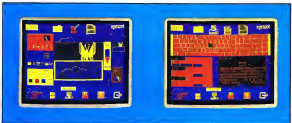
Unlike the second generation home and

educational computers — Commodore 64, BBC, and Spectrum the ACT FIE is a serious 16-bit micro designed to upgrade into a full hard disc-based business system if necessary.

Unlike the QL the Apricot has a reliable built-in mass storage system and software already developed for serious use on its larger cousins in the ACT range.

Although the FIE can display four out of 16 colours in up to 640 by 256 resolution it does not pretend to be a games machine. Programs like Infocom's Hitchhikers guide to the Galaxy are available but the Apricot's strength is the range of business software which its operating system makes available so it which paradoxically may increase its chances in the educational market. Brian Androlia, managing director of ACT claims that students "need the experience of using serious industry standard software which normally will not run on 8 bit micros."

It may be next year before new generation micros like the Atari 520 ST and Commodore Amiga are on sale with the range of software the ACT already has, so for the moment the FIE wins the battle of the supermicros. ■



PICKING THE TV



Luke Theodossiou
with the rules for
choosing a monitor.

WHEN WE LOOKED AT MONITORS — see *Your Computer* December 1984, page 84 — we made it clear that in our opinion dedicated standard resolution monitors did not provide good value for money. We therefore suggested that anyone in the market for a monitor should first of all determine the primary use the equipment is to be used for before even starting to look at what's available.

If you are currently using your domestic TV set as your VDU, then you are likely to be suffering from two main problems. The first is conflict of interests — you are interested in using your computer, whilst the rest of the family is interested in watching TV. The result — conflict! One possible solution to this is to buy a second-hand colour TV. Current prices range from around £75 to over £200. The other possibility on similar lines is to buy a new 12in. monochrome portable TV for about £55.

Neither is particularly satisfactory. A black and white TV is really quite useless for games and as just as bad — from a display quality point of view — even if all you ever do is text processing. The best advice here is — forget it. A second-hand colour set is perhaps more tempt-

ing but watch out. It's likely to be several years old and its display quality is not going to be as good as that achieved by modern sets, even if you found one which was in absolutely perfect condition.

Another mine field is making the right choice, not just what make but also which model and most important of all judging its condition. Unless you are a TV engineer you could end up wasting quite a bit of money on junk. Even if you found a good one, it's very much more likely to go wrong and repairs are expensive. All in all, the risks are just too high.

The other problem which is common to all TV sets, old and new alike, is the display quality when used in conjunction with a computer. Colours lack contrast, they are noisy, there are crawling interference patterns on the screen, etc. All this makes any serious work such as text processing or program compiling virtually impossible with eye fatigue into the bargain.

The reason for this is that the computer generates three distinct signals — Red, Green and Blue — at TTL level. These signals are the cleanest possible and are used to drive RGB monitors. In order to enable owners to use their domestic TV sets, two further stages of processing are necessary. The first is to combine the three signals, together with the synchronising signal — Sync — to produce a composite video signal. This is done for a particular broadcasting system standard — for example, most of Europe, including the UK, uses a colour encoding system known as PAL.

This signal is then passed to a modulator which converts it to a radio frequency — RF — signal which is just like the signal picked up by your TV aerial. All this additional processing very nearly wrecks the quality of the

Left: Fidelity CTM 1400 colour TV monitor. Below: Ferguson TX.



MONITOR FOR YOU

A few basic rules will help clarify any grey areas.

1. Remember, all current TV-monitors are standard resolution only. If you require higher resolution, then a dedicated medium or high resolution monitor is the only answer.
2. If you connect your computer via the aerial socket, the results will be identical to an ordinary TV. Monitor performance is only possible when using "direct" connections via the SCART socket.
3. Beware of monitor-look TVs which are not necessarily TV-monitors. This is easily checked but do make sure.

4. Before buying, check that your computer has RGB outputs, or at least a composite video output. If you have both always choose the RGB output for best results.

5. Sound can also be connected directly via the SCART socket but it's hardly worth it except for music programs or similar.
6. Although TV-monitors come in a variety of sizes, the larger sizes are best suited for use with video recorders. The optimum size for home computer applications is 14in.

7. FST (Flat Square Tube) equipped TV-

monitors are becoming available but the choice is limited and prices higher. FST does have some advantages over conventional tubes as well as being more pleasing on the eye but in our opinion it's not good value for money yet.

8. Think about your future display requirements before choosing your VDU. As always the best advice is to insist on a demonstration before buying.

Happy viewing!



original RGB signals. The job is finished off by your TV set which has to convert the aural signal back to separate RGB signals!

The sensible approach of course is to bypass all this encoding and decoding. This is where the TV-monitor comes in. Essentially, all it is is an ordinary TV set equipped with additional input sockets to enable direct connection from the computer to the appropriate point inside the set. Of course it's a little more complicated than that.

Amplifiers and impedance converters are used to ensure correct conditions for the signals; the TV signal has to be switched off; and the chassis has to have complete mains isolation. Although converting an existing TV for RGB operation is a theoretical possibility, the hassle, the expense and the safety risks involved make this proposition a definite non-starter.

For little more than the cost of a standard model, you get first class RGB monitor performance for your computer; a much better picture from your video recorder — by using the composite video input — and of course a TV set as well! ■

Right: Philips CT 2007 receiver monitor.

The buyers guide below is a fairly comprehensive chart of small screen TV-monitors currently available from high street retail shops. Most manufacturers also offer large screen sizes but these have been omitted from our chart. Some computer retailers have in the past offered other makes, mainly far eastern imports, but the trend now is to

stay with well known brands. Shopping around may secure some savings but at best these will be very modest. Our rating system — from 1 to 10 — is a personal assessment and takes into account price, availability, ease of use, general performance, etc. It is intended as a guide only and we strongly suggest that you view before you buy.

Brand name	Model	Size	FST	R/C	Price	Connecting leads	Remarks	Rating
Ferguson	TX MC01	14in.	—	—	£229	Included	Auto source switching Recommended	8
Fidelity	CTM1400	14in.	—	—	£219	—	Good value	7
Finlux	1014RGB	14in.	—	—	£275	Optional	Pricey	4
Grundig	P40-125	36cm	Yes	—	£269.95	—	Good but pricey	5
Grundig	P40-145	36cm	Yes	Yes	£299.95	—	Good but expensive	4
Mitsubishi	CT1501BM	36cm	Yes	Yes	£299	—	Good but expensive	4
Philips	1120	9in.	Yes	—	£300	Optional	Good but expensive	3
Philips	2007	14in.	—	—	£239	Optional	DIN socket	6
Tatung	TN1441	14in.	—	—	£199	—	Very good value; recommended	8

Key: FST = Flat Square Tube
R/C = Remote control

ATARI SYSTEMA

Competition RESULTS

APRIL'S COMPETITION to win a complete Atari system attracted one of the largest entries in living memory. Probably the prize was the main draw but contestants also appeared to relish the challenge we set — to write an Atari-related limerick.

Unfortunately many entries took a broad view of what a limerick is. Thus we had odes to Atari, sonnets, rhyming couplets, 100 line verse epics, blank verse, ditties and numerous other verse forms. But, good though they were, we had to disqualify them: if it doesn't have five lines it is not a limerick.

It was also probably a mistake to end one of your lines with the word Atari. As there are only a limited number of rhymes with Atari most entries of this type tended to sound the same. They usually involved young men on safari, driving Ferraris, and sipping Camparis. One of the best of these was V. Skinner's: A compulsive eater called Mame Likes to nibble while drinking Campari Between liquid saps She's mad about chips And gets far better bytes from Atari.

In the same line B. Axelrod almost clinched it but stretched the rhymes too far: Charles and Diana's son Harry

Was given a brand new Atari But Prince William was mad Cos just a Spectrum he had So he threw the Atari Atari

Perhaps M. Eston had the right idea with his succinct:

Atari Atari Atari
Atari Atari Atari
Atari Atari
Atari Atari
Atari Atari Atari

J. Outram likewise came up with something different.

A computer fanatic from Rhodes Wrote a program for making up odes The Atari possessed him But his Spectrum outguessed him By producing last lines much longer than any of the others and with no apparent rhyme.

Among the other contenders were a number of highly competent entries from abroad. In fact E. Tejer's from Jerusalem was one of the few which caught the true spirit of Edward Lear: A man known to me and to you

Runs Atari (ran Commodore too) He thinks it is nice To fight elephants with mice I think he should open a zoo.

D. Williams' limerick also struck the right nonsensical note although it goes astray in the last line.

Luton to Jumping Jack Tramm He's cutting the prices like ham His methods are sound XLA for the pound You get more for your Paces from this man.

All these were in the running but after much deliberation we awarded the prize to Mame McNally, 8 Raglan Gardens, Cavenham, Reading, Berkshire, for: Mixing up Singapore and Djakarta Jack Trammel would call corrupt data But it's nothing so sinister Just the lady Prime Minister We should swap for an Atari — it's smarter.

The mix up referred to was made by Mrs. T on her recent visit to the Far East.

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ATARI 800XL ENTERTAINMENT PACK

Great value for games addicts who appreciate high quality graphics and occasional arcade action games! For the first time, you can buy a full Atari 800XL computer with two full arcade ROM cartridge slots and a joystick. These two ROM slots are the perfect choice for Donkey Kong and another favorite. You can only have a limited number of games with the Atari 800XL, so you may be interested in an arcade entertainment package of the same value. The 800XL Entertainment Pack of five new titles for money and arcade games is just £69.99, saving half of the normal £149.99 of the pack items when purchased individually. Atari Shop has a wide range of ROM cartridges available including arcade classics like Super Star Trek, Super Cobra for only £3.99 each! The 800XL is a sophisticated home computer with the Basic Programming Language built in and if you later add a 1010 Program Recorder (XLC P 1010 - £54) a range of hundreds of cassette programs will become available to you. The Atari 800XL is acknowledged as a first class games machine.

ATARI PACKS - POWER WITHOUT THE PRICE!



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Total if purchased separately £77.96
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PACKAGE PRICE (XLC 1050) £53.99

£69

ATARI 800XL AND RECORDER PACK

The Atari 800XL is packaged here with the 1010 recorder in professional storage and without any of the usual Atari game and programming add, all for a package price of only £129.99. The 1010 is a really good £69.99 of the individual items when total £129.99. The game included is a classic Pole Position, now of course from Atari. Pole Position is an accurate reproduction of Atari's very highly successful arcade driving game which has all the thrills and spills of the grand-prix racecourse. On the review of this classic is a comprehensive program of Atari's amazing sound and graphics capabilities gives an example of the high quality performance at the Atari 800XL. Also included is an Invention to Programming 1 cassette which takes you step by step through the first stages of programming in Atari Basic using Atari's unique soundthrough facility which allows you recorded human speech to be played through your TV speaker. All you need is a cassette (ATJ C 009 - £7.99 for Pole Position), to be up and running with this program. The Atari 800XL in this pack comes with a 30 day free return guarantee.

ATARI PACKS - POWER WITHOUT THE PRICE!



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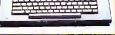


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Your actual fighting area is eight times larger than the screen. However enemy planes have a wrap-around capacity which allows them to keep flying while you have run out of air space. You lose a life if you crash into the horizon, crash into an enemy plane or get hit by one of their bombs. However, as you are defending Three Mile Island there is a greater danger than losing your three lives, the danger of a nuclear explosion. On the main screen display you will see the word "Techs" and beneath it a number of small figures, if the enemy planes drop a bomb on your fuel dump building you lose a technician; lose all your techs and the resulting nuclear blast destroys everything including your remaining three lives.

To further the difficulty of the task set for you the enemy has invented a new heat seeking missile which unlike their attack planes can travel faster than you. This missile only appears after you have killed three enemy

This is one of the few scrolling games written for the Electron — the lack of scrolling games is mainly due to the large size of the screen memory. BBC users can get over this problem by using the 6845 chip — not present in the Electron — to control full screen scrolling via registers 12 and 13. To counter this problem I have used a screen window of exactly 32 bytes wide, which enables fast and easy handling of the screen display since when displaying the contents of the window the computer does not have an X position number larger than 255 thus enabling a simple loop involving only one of the computers registers.

There are two listings to type in, check, save and then run. The first program is the main machine-code program containing most of the graphics, sound definitions and all the machine-code routines while the second handles setting up the screen display, keeping the score, storing the high score table etc, although quite long, the program is well worth typing in as the finished product gives some pleasing screen displays and presents a very playable game. If BBC users wish to play *Jump Jer Assault* then they merely have to increase the contents of the x and y registers in line 460 of program 1 to a suitable value found through experiment.

```

MDSR:J3RR99:cbbb
430L:DMA64F:R8E000:LDMA4F:CHP18:RNE00:CLC:LDMA62:ADC
MA62:STAB46:LDMA61:ADC1:STAB46:LDV07:LDMA1640:Y:CHP18
R8E000:J3RR99:cb
440:R8E000:LDMA0:LDV00:AA5:LDMA994:Y:RNE000:INX:J3R
R99:INX:J3R:CHP18:CHP99:ONEA00:CPA99:RNE00:R8E000:
R8E000:INCMP99:CLC:STAB99:ADC5:STAB99:CHP25:RNE00:
LDMA20:STAB99:LDMA5:STAB99:J3C5
441:LDMA4F:CHP18:RNE00Y:LDMA1:CHP000:BEQ:Y0:SE:CLC
CL:RMA1:RDC1:STAB1:CLC:J3R990:J3RR11E:Y07
450:J3RR99:
460:delay:LDMA000:LDMA1000:SE:DMA:CHP3:ONE:RT
S
470:J3RR:LDV00:CLC:LDMA262:LDMA62:Y:INX:CPH32:ONE:
RTS
480:fire:LDMA9F:R8E000:LDMA1:R8E000:LDV01:yy0:LDMA
994:CHP00:SE:J3R:INX:CHP000:RNE00Y:RTS:Y:J3RR00:SE:
CLC:LDMA99:STAB1:STAB1:CLC:J3RR00:
490:DMA00:Y:CHP01:DMA099F:DMA00:Y:LDMA0:STAB0:SE:
Y:DMA0:DMA9F:CHP04:SE:CLC:CLC:LDMA0:ADC03:STAB00:Y:
STAB04:DMA61:ADC00:STAB005:Y:STAB46:J3RR1P13:LEF
SE:CLC:LDMA0:SE:DMA:STAB005:Y:STAB46:LDMA1:SE:DMA:
Y:STAB46:J3RR1P13:end:RTS
510:SE:CLC:LDMA00:Y:STAB46:LDMA005:Y:STAB46:J3RR00:
INCMA9F:LDMA00F:Y:CHP07:RPLNE:
520:DMA005:Y:AND02:CHP02:R8E001:SE:CLC:DMA005:Y:SE:DMA
0:STAB005:Y:STAB46:LDMA005:Y:SE:DMA:Y:STAB46:
J3RR1P13:end:LDMA0:DMA005:RTS
530:R010:CLC:LDMA00:Y:ADC10:STAB00:Y:STAB46:LDMA0
50:Y:STAB46:STAB005:Y:STAB46:J3RR1P13:
540:ldv01:LDMA005:Y:LDMA0:STAB46:Y:RTS
550:J3RR:LDMA248:J3RR1
560:print:LDV00:LDMA162:Y:STAB00:Y:INX:CPH32:ONE:RTS
570:SE:LEF:LDMA62:CHP36:LDV25:SE:DMA:LDMA62:CHP36:
580:J3RR00:
590:one:INCMP99:LDMA99:CHP1:RNE000:LDMA0:STAB9F:R
TAB99F:LDMA0:LDV25:STAB62:LDMA0F:DIV25:LDMA63:co
60:RTS
610:one:LDMA0:LDV25:STAB62:LDMA0F:DIV25:LDMA63:
620:LDV00:
630:LDV:LDV00:J3RR00:STAB600:SE:DMA:LDMA63:DMA63:

```

[illegible]

(continued on page 55)

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HOW MANY times have you wished you could boost your games programs with some background music as in *Music Mixer*, *Automania* and *Gilligan's Gold*? Well, now your wish has been granted with Backboogie!

Backboogie will repeatedly play a piece of music, short or long, without interfering with the running of your own programs!

The program itself is 100 per cent machine-code and uses the Spectrum's interrupt system to run it. As a lengthy discussion about the system is not needed here, I will just say that the Spectrum can be made to run a machine-code program stored at a certain memory address every 1/50th second — this process is known as an "interrupt".

The Basic program in listing 1 helps you

compose your pieces of music and also stores some necessary data in the memory.

Let me explain how the program works. The music you compose is stored as a series of numbers, each representing one note, i.e.:

- 0 for C
- 1 for C#
- 2 for D, etc.

The Spectrum's own program for converting these numbers into values the Sound Generation Rom Routine can accept is too slow, so I have developed a faster routine using the data stored by the Basic program.

Having calculated these values, Backboogie calls the Sound Generation Rom Routine to produce a short musical sound before returning to your game.

S
P
E
C
T
R
U
M

B
A
C
K
B
O
O
G
I
E

Listing 1

```

1 LOAD ""CODE
2 REM ***BACKBOOGIE***
3 REM *****BY*****
4 REM ****TIM*CLOSS***
5 CLS
10 GO SUB 1000
500 LET G=60672
505 RESTORE 2000: FOR H=1 TO 21
: READ K$: PRINT AT H,0;K$; AT H,30;K$: NEXT H
510 LET A=2: LET B=21
512 PRINT AT B,A: PAPER 0; " "
513 IF INKEY$="7" AND B>1 THEN LET B=B-1

```

(continued opposite)

(listing 1 continued)

```

515 IF INKEY#="6" AND B<21 THEN
PRINT AT B,A; PAPER 7;" ": LET
B=B+1
516 IF INKEY#="1" AND A>2 THEN
LET G=G-B: LET A=A-1
520 IF INKEY#="0" THEN GO TO 53
5
525 IF INKEY#="E" THEN GO TO 56
0
530 GO TO 512
535 FOR H=6 TO G+7: POKE H,22-B
: NEXT H: LET G=G+B
540 LET A=A+1: IF A=30 THEN LET
H=USR 60148: LET A=29
545 FOR J=21 TO B STEP -1: PRIN
T AT J,A; PAPER 0;" ": NEXT J
550 GO TO 512
560 LET D=G-60672-2: POKE 60250
,INT (D/256): POKE 60267,0-(INT

```

```

(D/256))*256)
570 STOP
1000 RESTORE 3000
1010 FOR H=0 TO 20
1020 READ J: POKE 60416+H*4,0: P
OKE 60417+H*4,(J/96)
1030 LET K=437500/J-30.125: POKE
60418+H*4,INT (K/256): POKE 604
19+H*4,K-((INT (K/256))*256)
1040 NEXT H
1050 RETURN
2000 DATA "G#","G","F#","F","E",
"D#","D","C#","C","B","A#","A",
"G#","G","F#","F","E","D#","D","C
#","C"
3000 DATA 261.63,277.18,293.66,3
11.13,329.63,349.23,369.99,392.4
15.3,440.46,466.16,493.88,523.25,55
4.36,587.32,622.24,659.24,698.44
739.97,783.97,830.58,879.97

```

The game then continues running until, 1/50th second later, it is necessary to produce another musical sound of the same frequency as before. When a series of short sounds is heard in quick succession like this they give the impression of a continuous musical note.

The composer allows any note within a range from middle C up to 20 semitones above to be entered. Use keys 6 and 7 to move the bar up and down until it is level with the desired pitch. Pressing 0 will now enter the note and the bar will move across one column. You can delete a note by pressing 1 — the bar will move back one column. Continue entering your notes until you have finished your composition.

Pressing E will add final specifications to the machine-code routine and then cause you to escape from the Basic composer program.

Your music can now be saved, together with all the other necessary data and routines by typing:

```

SAVE "BACKBOOGIE" CODE 60180,0-500
and loaded by typing:
LOAD "" CODE

```

To "switch on" your music during a program, include:

```

POKE 65534,0: POKE 65535,237: POKE
65532,0: POKE 65533,0
RANDOMIZE USR 60180

```

To "switch off" your music, include:

```

RANDOMIZE USR 60190

```

First, enter the composer program in listing 1 and save it by typing:

```

SAVE "COMPOSER" LINE 1

```

Now New the program and type in listing 2. Run the program and enter the code in listing 3, working from left to right and from type to



bottom. When you have finished, the code will automatically be saved as Boogie.

If you do not wish to type in all the programs and code yourself, send a blank cassette, SAE and £1 to me at: 5 Western Drive, Shepperton, Middlesex TW17 8HJ.

Listing 2

```

10 DEF FN H(H#)=16*(CODE H#(1)
-48-(7 AND H#(1)>"9"))+CODE H#(2)
)-48-(7 AND H#(2)>"9")
40 FOR N=60148 TO 60288 STEP 8
50 LET T=0
60 PRINT N;" ": ;
70 INPUT H#: PRINT H#;
80 FOR B=0 TO LEN H#-1 STEP 2
90 LET Z=FN H(H#): LET T=T+Z
100 POKE N+B/2,Z
110 LET H#=H#(3 TO )
120 NEXT B
130 PRINT " = ";: INPUT Y: PRIN
T Y
140 IF Y<T THEN PRINT "INPUT E
RROR - TRY AGAIN": GO TO 50
150 NEXT N

```

Listing 3

```

60148 : 2102581103580616 = 259
60156 : C5061C1A77231310 = 446
60164 : FA232323231313 = 447
60172 : 13C110ECC9000000 = 665
60180 : ED5E3E30ED47C900 = 950
60188 : 0000ED56C9000000 = 524
60196 : 0000000000000000 = 0
60204 : 0000000000000000 = 0
60212 : 2AFEFF7ECB27CB27 = 1161
60220 : E56F26000100ECD = 852
60228 : 4A56235E2346234E = 507
60236 : 6069CD8503E12322 = 884
60244 : FFFF2AFCCF3E00BC = 1308
60252 : 280C2322FCFF1C1 = 1062
60260 : D1E1FBC338003E26 = 1036
60268 : 8D380218ED210000 = 541
60276 : 22FCFF2100ED22FE = 1099
60284 : FF18E30000000000 = 506

```

THIS STARTED off as a seemingly simple editor. What I wanted was a means of preparing a data file which could be used by an assembler program to produce an interrupt driven tune. Once the code produced by the assembler had been installed, the tune would repeat itself until it was deactivated or the Break key pressed.

The problem with preparing a musical data file is that there needs to be a method of specifying the pitch and duration of the notes. Standard musical notation turned out to be the most sensible system to produce the file. Although this editor is based upon musical notation it is not presented as a music processor. It has a limited range of notes and, in particular, no capacity for a rest. It is, however, capable of producing simple tunes for accompanying games etc.

To make full use of the BBC's sound capacity it is not only necessary to manipulate the Sound command but also the Envelope command. Consequently, an envelope editor has been added to the system. Provision for a screen dump was included to allow the editor to produce sheet script.

What started out as a supposedly simple editor to produce a small data file became a fairly sophisticated project in its own right. The editor can cope with up to 200 notes over a one and a half octave range. The envelope can be modified over its full range; and will be saved with any data file produced.

Piano type envelope

To use the system enter listing 1, Inload and listing 2, Intrune. Running Inload will define the characters needed for the main program and produce a default piano type envelope. The characters are printed as a check and the second program loaded. For disc users the name of the second program will have to be defined, for tape users a blank Chain "" statement will load the next program on the tape.

When loaded the editor presents the user with a blank page. To define a note its pitch and duration have to be selected. The pitch of the note is controlled by the cursor's position on the staff. The cursor can be moved up and down the staff using the up and down arrow keys. The left and right arrow keys move the cursor backwards and forwards through the tune.

The duration of the note is indicated by the symbol in the lower right hand corner. The duration can be increased with the f0 key and decreased with the f1 key. A note is entered at the current cursor position by pressing Return. If the cursor is in the middle of a tune all succeeding notes will be shifted along to

In this, the first part of his article, Fintan Culwin details a BBC editor with a simple background music facility.

make space for the note being inserted.

If a note needs to be deleted, pressing the Delete key will remove the note from underneath the current cursor position and move back any succeeding notes. There is space on a page for 20 notes. Moving before or beyond this automatically takes you onto the next page. If this is too pedestrian then keys f5 and f6 will move backward and forward one page at a time. Pressing f2 will play all the current tunes using the current envelope.

After coming to terms with the music setting the envelope editor can be invoked by pressing the f7 key. To understand the screen it is necessary to consult the User Guide. Page 245 identifies the effects of the 13 parameters and labels them. These labels are reproduced on the screen, alongside the current value of the parameter. The currently selected parameter is highlighted in inverse video.

A table of 13 numbers is almost impossible to comprehend. Above the table the settings of the parameters are indicated by 12 bar-graphs split into four clusters. They are grouped as the PI parameters, the PN parameters, the AAAS & AR parameters and the ALA and ALD parameters. A description of the effects of changing these parameters is given in the User Guide.

A practical appreciation can be obtained by experimentation. A parameter to be changed is highlighted using the left and right arrow keys. The value is changed within its limits using the up and down arrow keys. Pressing the Return key will sound the envelope; when you are satisfied pressing the Escape key will return to the music editor. The current envelope specification will be saved and recalled with any tune.

Pressing f8 causes a printer dump to be performed. In the configuration given page 10 of memory — &A00 to &AFF — is assumed to be available for use. This is acceptable for disc users, tape users will have to use page 14 — &D00 to &DFF. Examining listing 2 shows a dummy RTS code has been inserted.

If you want to use this facility then the Remmed *Load command will have to be activated, to load into memory your own screen dump code; and the dummy RTS command removed. This can be omitted if screen dumps are not required. When you are ready to leave



BBC

the system f9 will cause an orderly return to Basic.

The basis of the editor is a list of note codes held in memory. Each note requires two bytes to define its duration and pitch. These are held in memory in the reserved byte array labelled tune%, defined and initialised within PROC prepare. The only obscure parts of the preparation are the definition of an Oswald area which will be used to obtain character definitions for the double height plotting routine.

Retrieved from memory

There is no legitimate method to obtain an envelope definition within the operating system. Consequently the envelope parameters have to be retrieved from memory into the envelope% array using Peek.

The first part of the main listing, as far as PROC MAIN contains various procedures concerned with screen operations. The most transportable procedure is PROC bighar, whose parameter identifies a character to be plotted on a screen in double height. Using this procedure modifies the effect of being forced to work in 20 column mode.

Listing 1.

```
10 FOR INT LOAD
20 FOR EDITOR LOADER
30 FOR FINTAN CLAMIN
40 FOR APRIL 85
50 NEXT
110V0U25,248,16,20,10,16,104,120,120,40
110V0U25,241,46,120,120,104,16,80,20,16
110V0U25,242,16,20,10,16,104,120,120,40
110V0U25,245,46,138,121,104,16,10,20,16
110V0U25,244,16,16,16,16,104,120,120,40
110V0U25,245,46,120,120,104,16,16,16,16
110V0U25,246,16,16,16,16,104,120,120,40
110V0U25,247,46,138,121,104,16,16,16,16
110V0U25,248,16,16,16,16,104,80,72,40
110V0U25,249,46,72,88,104,16,16,16,16
110V0U25,250,16,16,16,16,104,80,72,40
110V0U25,251,46,72,88,104,16,16,16,16
```

```
220V0U25,252,8,8,8,8,56,48,72,112,8
210V0U25,253,8,8,8,8,56,48,72,112,8
240ENV0LPE,4,0,0,0,0,0,0,121,10,-5,
-2,120,120
250FOR I=1 TO 10
260 FOR J=1 TO 253
270 V0U char,32
280 NEXT J
290 V0U 17,10,10
300NEXT I
310FOR pitch = 97 TO 177 STEP 8
320 SOUND 1,4,pitch,5
330NEXT pitch
340 PAGE=1:GOTO
350 IF 10 PA,10,10,10,10,10,10,10
360 CHIN --
```


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· THE NEW AMSTRAD CPC 664 WITH BUILT-IN DISC DRIVE



The advertisement features a black and white photograph of an Amstrad CPC 664 computer system. The monitor, positioned centrally, displays a bright yellow screen with a green bar chart and a table of data. The keyboard, with its distinctive blue and white keys, sits in front of the monitor. To the right of the keyboard is the built-in floppy disk drive, labeled 'FDD'. A 5.25-inch floppy disk lies on the surface in front of the drive. The entire setup is set against a dark, atmospheric background with swirling, ethereal light patterns. The overall aesthetic is that of a vintage computer magazine advertisement.

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There are hundreds of programs for business or pleasure available on disc (and cassette) to CPC 664 users. Many from Amsoft, others from other

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AN EXPANDING

· SYSTEM ·

There is a complete range of peripherals available to CPC 664 users which plug directly into the built-in interfaces.

These include a joystick, additional disc drive (to double your on-line storage) and the Amstrad DMP-1 dot-matrix printer. (There's also a cassette interface so that you can use CPC 464 programs on tape). And there are many more peripherals from Amstrad and other manufacturers which can be used to enhance the CPC 664.

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IC0642

HERE'S A colourful asteroids-style game for the Amstrad CPC-464. While using Mode 1 it manages to give a whole range of colours and provides Mode 0 size text printing on the screen using a Rom induction. Get yourself a high score by shooting the eggs and aliens but watch the bonus. Quick shots will score well but be slow and the bonus will turn against you!

The game features 44 sprites of different sizes with up to 25 on the screen at any one time. These are controlled by a machine-code routine that can easily be adapted for your own purposes. In fact, most of the action is controlled by machine-code making the main Basic game loop very short and speedy.

The main program appears in listing 1 and may be typed in directly. It should be saved with Goto 20000 — before running as any mistakes in the data may cause the system to crash. The machine-code is in five routines, three of which are listed so that you can use them in your own programs. The first one — listing 2 — is for wide printing mimicking mode 0 routine.

In fact, it will work in any mode with suitable changes to the final few bytes to reset the cursor position. It works by altering the high byte of the Rom indirection at &BDD5 using Pulse so that instead of pointing to the Rom routine at &134A, it points to our routine at &A34A.

We can then use the usual Print command including the Print Using format. The colour of the printing is given by the pen mask — changing this can give striped writing or mixed colours. Note that the indirection supplies the screen position as a physical

Listing 1

[illegible][illegible][illegible]

PRESS Y FOR ANOTHER GO

MIN 1 BONUS 1785 ***110 HI 1000

Christopher Leigh presents a new version of a favourite shoot-'em-up using sprites in glorious colour.

The first byte of the shape data is the size of the sprite in quarters. The rest of the shape data comprises bytes made up in the same way as characters are plotted on the screen in Mode 1.

As already suggested, IMove only needs to be called once a game cycle to move everything. Printing of score and bonus is done once a second by calling the routine at line 200. All that remains is to read the keys, produce sound effects, check for collisions and keep the bullets firing.

For the sake of speed the last two requirements are covered by two routines tailored for this game. Collision checking is done by reading the collision flags of each sprite and by checking for identical positioning. The latter is only needed for a stationary sprite. Eight bullets are allowed on screen at any time so as each is fired the one eight back must be erased. Key checking is left in Basic so that you can easily change the program to suit your fingers, and the speed can be changed using p% in 1070 and 4010.

Note that your subspace thrusters always work in the direction you are pointing so that once moving you need to turn round in order to slow down. Remember your hyper space dive is kaput so using it could well land you in the middle of one of those eggs or in the firing line of your own bullets. The faster you shoot the aliens the larger the bonus — if you take too long your bonus will become negative having a disastrous effect on your score!

Should you wish to start firing immediately without typing in the lengthy data, you should send [3 for a tape to C.J. Leigh, 12 The Basserts, Cashes Green, Stroud, Glos GL5 4SJ. Ask for Space Eggs and don't forget your name and address.

SPACE EGGS

position — top left = 0, 0 — whilst the cursor must be reset to the logical position — top left = 1, 1 — hence the extra increment instructions.

The second and third routines control the sprites and are called using Resident System Extension (RSX) commands Move and Erase must be preceded by the elongated colon — shift @ — and Ierase must be followed by a comma and its parameter which is the address of the first byte of the move data for the sprite.

The screen is 80 bytes wide and the sprite routines divide it into 50 half lines high, so that each sprite unit is a quarter of a Mode 1 character. These routines can cope with sprites of any size and — with slight alterations — of any shape. All our sprites will be set in a square sprite shape definition, but since zero bytes are not written to the screen — making the sprite transparent — the sprite can be any shape within that framework.

As written the procedure allows full wrap-around, adjusting for sprites being partly off a screen edge. Again fairly simple alterations will allow sprites to bounce.

Ierase simply erases a sprite and turns it

off. IMove works by calculating the old sprite position and then writing it with an ink mask of zero to rub it out, then calculating the new position and writing with the ink mask given in the move data.

This ink mask can be set to produce pure colours or colour mixtures for a whole sprite. The new position is calculated by adding the speed components to the old position and then ensuring it is on the screen. The move data also includes the address of the shape data for a particular sprite and a collision byte. This collision byte is the last non zero byte read off the screen when writing the sprite. This allows us to know if it is on top of anything and also what it is a top of.

The move data consists of nine bytes formatted thus: on/off flag, right position, down position, right speed, down speed, ink mask, shape address low, shape address high, collision byte. IMove will, in fact, move every sprite, whose on/off flag is one, in the block of move data and the routine is stopped by a value of two. The shape data address can be altered to change the shape of a sprite during the game as is done to rotate your space ship.

Listing 2.

ORIGIN A34A	C5	PUSH BC	
ES PUSH HL	95	PUSH DE	
FS PUSH AF	9496	LD B,04	stretch to 4 bytes
CDIASC CALL DCJA	AF	XOR A	
F1 POP AF	CB21	SLA C	first pixel
EX DE,HL	3092	JRNC B2	pixel to screen byte
CALL ERASE	F4CC	OR A,CC	mask pen 3
R67 LD B,07	CB21	SLA C	next pixel
96 CHROW LB C,(HL)			(continued on page 67)

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(continued from page 63)

3337	SMC 32		E1	POP HL	
F432	OR A,30	16bit half of byte	29	INC HL	next character byte
12	LD (3E),A	16bit to screen	C1	POP BC	recover row count
13	INC DE	next screen address	183E	32ND CHARROW	next character row
183F	32ND BYTE	16bit for next pixel	E1	POP HL	reducer cursor position
01	POP DE	screen address	24	INC H	
05	PUSH HL	leave matrix address	24	INC H	
218903	LD HL,890		24	INC H	
19	ADD HL,DE	next screen row	2C	INC L	preposition cursor
03	EX DE,HL	16bit in 3E	C37539	3F 3975	STXT_SET_CURSOR

Listing 3.

		ORIGIN A400	F339	CP 39	off screen bottom?
018E64	LDON	LD SC,JRPTAB	3082	JR C,02	
218AA4	LD HL,BUFFER	16bit up new Commands	D439	SUB 39	
0DD1BC	CALL DCD1	16byte workspace	C08F	SRL A	divide by two
C9	RET	16KL_LOG_EXT	3082	JR NC,02	
00000000	BUFFER	DEFS 4	1428	LD 20	middle of line
1A44	JRPTAB	16command names address	2602	LD L,A	
C3CEA4	JP ERASE		F1	POP AF	prepare to multiply
C328A4	JP MOVE		35	PUSH DE	
40524153	DEFF "ERAS"		29	ADD HL,HL	times two
C5	DEFF "E"+02		29	ADD HL,HL	
404F56	DEFF "MOV"		29	ADD HL,HL	
C5	DEFF "E"+09		29	ADD HL,HL	
00	NOP	send marker	ED	PUSH HL	sixteen times
0D2180D0	MOVE	LD IX,ASPR	D1	POP DE	
1849	JR CHKEND		29	ADD HL,HL	
21CA64	NEXSPR	LD HL,PMASK+1	29	ADD HL,HL	times sixty four
3600		LD (HL),0	19	ADD HL,DE	times eighty
0D7E01	LD A,(IX+1)	16right position	D1	POP DE	half line offset
000000	DEFS 3	16for MC_WAIT_FLYBACK	19	ADD HL,DE	
C079A4	CALL WRISPR	16erase old sprite	1429	LD B,C	start of screen
21CA64	LD HL,PMASK+1		5F	LD E,A	right position
0D7E05	LD A,(IX+5)	16sprite mask	19	ADD HL,DE	screen address
77	LD (HL),A		D1	POP DE	data address
0D7E02	LD A,(IX+2)	16down position	3E04	LD A,04	four lines a block
006464	LD A,(IX+4)	16down speed	F5	PUSH AF	
F246A4	JP P,02		C5	PUSH BC	width parameters
C638	ADD 38	16ensure positive	E5	PUSH HL	
F638	CP 38		1A	BYTE	LD A,(DE)
3082	JR C,09		F639	CP 08	
3638	SUB 38	16not too large	208C	JR Z,ZERO	ignore zero bytes
0D7792	LD (IX+2),A	16own down position	7E	LD A,(HL)	screen byte
057E03	LD A,(IX+1)	16right position	F639	CP 00	check collision
006463	ADD A,(IX+3)	16right speed	2083	JR Z,03	
F25AA4	JP P,02		0D7798	LD (IX+0),A	collision flag
C638	ADD 38	16ensure positive	1A	LD A,(DE)	sprite byte
F638	CP 38		E6FF	MASK	AND FF
3082	JR C,02		77	LD (HL),A	write screen
3638	SUB 38	16not too large	19	ZERO	INC DE
0D7791	LD (IX+1),A	16own right position	23	INC HL	next screen byte
00348000	LD (IX+0),00	16CLEAR collision flag	03	DEC C	
C079A4	CALL WRISPR	16write new sprite	2080	JR NZ,ROOM	room for sprite
118980	MOVEON	LD DE,09	D5	PUSH DE	
0D19	ADD IX,DE	16check next sprite	AF	XOR A	
0D7E09	CHKEND	LD A,(IX+0)	118989	LD 3E,0020	
1F	RRA	16sprite on?	C3D2	DEC HL,DE	start of line
3081	JR C,NEXSPR		D1	POP DE	
1F	RRA	16no more sprites?	10E9	ROOM	32ND BYTE
20F2	JR NC,MOVEON		E1	POP HL	next width byte
C9	RET		218980	LD 0C,0000	
F5	WRISPR	PUSH AF	09	ADD HL,BC	next screen line
B450	SUB 50		C1	POP BC	
2044	NEG		F1	POP AF	
4F	LD C,A	16room for sprite	30	DEC A	four lines
0D6602	LD H,(IX+2)	16down position	20D3	JRNC,LINE	
0D5E06	LD E,(IX+6)	16shape data address	F1	POP AF	
0D5A07	LD B,(IX+7)	16shape high byte	E1	POP HL	
1A	LD A,(3E)	16size of sprite	24	INC H	
47	LD B,A	16width	2D	DEC L	
4F	LD L,A	16height	20A2	JRNC,VERT	next vertical block
13	INC 3E		C9	RET	
E5	VERT	PUSH HL	35	ERASE	PUSH DE
F5	PUSH AF	16right position	21CA44	LD HL,MASK+1	data base address
35	PUSH DE		3600	LD (HL),00	clear pen mask
118980	LD 3E,0000		30E1	POP IX	
F5	PUSH AF		0D340000	LD (IX+0),00	turn sprite off
7C	LD A,H	16down position	0D7E01	LD A,(IX+1)	
			C379A4	JP WRISPR	

RAMDISC



stored. The easiest way to save code to tape is with the `*t` command — see later.

All commands consist of an asterisk followed by a lower case letter, possibly followed by parameters.

`*l Load` — must be followed by a file name as a string up to 10 characters. If file name is null (" ") then the most recently saved file of the correct type — program or code — will be loaded. Options `Screen$` and `Code` are provided and are exactly the same as the tape versions. Data is not available.

`*s Save` — must be followed by a file name. The name may not be null. Options `Code`, `Screen$` and `Line` are provided and are the same as the tape versions. Data is not supported, but programs are saved with their variables. When a file under the same name — and type — is already on the disc, it is overwritten. The file is also moved to the top of the disc.

`*m Merge` — only works with program files, works the same as the tape version.

`*d Delete` — must be followed by a file name. You must specify `Code` to delete a code file. If the file name is null then the most recently saved file is deleted.

`*c Catalogue` — has no parameters. It prints a list of all files on the disc in exactly the same way as `Load` prints file names for the cassette system. It also prints the number of available bytes on the Ramdisc.

`*e Erase` — erases the whole Ramdisc.

`*t Tape` — must be given a file name. It saves all the files on the Ramdisc and the Ramdisc operating system to tape as a standard code file. This means that you can save and load a whole environment in one chunk of code. To load the file from Basic,

```
LOAD 30000
CLEAR 30000
or whatever value you are using,
LOAD "" CODE
```

and then

```
RANDOMIZE USR 63600
```

to switch the new commands on.

`*f Free` — prints the number of bytes free in the Basic system, i.e. below Ramtop. You may need this value when deciding where to place Ramtop. To get the total available space in the machine add this value and the value from catalogue (`*c`).

`*x Basic delete` — deletes all Basic lines in the given range including the start and end lines. It is not strictly a Ramdisc command,

but is a very short routine and should be useful.

In addition the New command has been redefined to print the new logo, and the Clear command now checks that the new value of Ramtop will not cause the Ramdisc to be overwritten. In cases where this would occur, the report "Out of memory" is given.

Error conditions and messages.

4 Out of memory — occurs when saving to the Ramdisc when there is not enough space for the new file. The area to be reclaimed if the file already exists is taken into account, so deleting the old copy will have no effect. Try moving Ramtop down by Clearing. If it occurs during loading or merging then there isn't enough space in the Basic area for the program.

8 End of file — occurs when loading, merging or deleting a file which does not exist — i.e. the end of directly had been found without finding the file. Sometimes occurs because you leave out the Code when loading bytes.

The value of Ramtop splits the available Ram into space for Basic and space for Ramdisc. A value of 30000 gives Basic reasonable space and leaves 34K for the Ramdisc. If you Clear too low Basic will reject your Ramtop, and if you Clear too high you will get the "Out of memory" error.

The method used for redefining commands consists of two pieces. First, a copy of the kernel of the Rom is made in Ram. The idea is that control will stay in the Ram, just calling Rom routines when required. There is one snag, the Rom routine check-end 1BEE throws away its return address. To overcome this some code is inserted in the error routine in case new commands fail the syntax check.

Once this is done it is easy to define new commands, and I have left 25 bytes free in the jump table in case you want to add some. Disassemble from 64381, and move the instruction at 64422 down to accommodate your commands. If you don't like the default colours of white on black,

```
POKE 63714
```

with the attributes you want.

The main use of this system will probably be for small Basic programs under development, and for keeping utility programs handy. It also enables you to load and save screens very quickly, although you are limited to about four screens. There are other not so obvious uses though.

After I had written the program I still had the problem of generating the hex dump data statements. It is easy to print what looks like a program listing, but then you can't edit or run it.

I wrote a Basic program to poke the Data statements together with line numbers, line lengths and trailing Enter bytes into unused memory — just above Ramtop — then saved this as a code file on Ramdisc, poked around with the header to change it to a program, then loaded the program.

If you want to have other machine code in the machine you could put it in the printer buffer or UDG area if it is small enough. If it is too big you could put it just above Ramtop, and keep a careful watch on your Ramdisc size, or save a dummy chunk of code to reserve an area in the Ramdisc. ■

DATA

```

CALCULATION AND WRITE BACK REPORT
REPORT SOURCE LISTING REMS

SCREEN ON :PRINTER ON
REPEAT IF (0)=0:IF (2)=0
:READ
:MOVE F(0),NET INVMOVE F(2),ADD BAL
:MOVE INV VAL,F(1)
:MOVE VAT,F(3)
:MOVE PAYMENT,F(4)
:MOVE DISC,F(5)
:IF (0)=1:IF (3)=F(2)/100:IF (100-F(3))/100
:IF (2)=F(2)+F(4)+F(5)
:MOVE F(0),NET INVMOVE F(2),ADD BAL
:WRITE
:SNET INVM...      SADD BAL...

UNTIL EOF
*
* NOTE THE USE OF THE WRITE COMMAND TO UPDATE THE NET INVOICE AND ACCOUNT
* BALANCE VALUES.
* NOTE ALSO THAT THE USE OF THE WRITE COMMAND DICTATES THAT THE DATABASE
* MUST BE RESTRUCTURED BEFORE FURTHER EDITING CAN TAKE PLACE.

```

EXAMPLE OF SIMPLE TABULATION REPORT

```

SCREEN ON :PRINTER ON
:REPEAT
:Mo. Name
:TEL Insts DATE
:REPEAT :READ IF (0)=F(0)+1
:IF (0)=1:Name.....:TELs :Insts :DATE...:COMPS.....
UNTIL LINK = 2000 EOF
FORMUNTIL EOF

```

NOTE THE USE OF A 'S' AS A REM STATEMENT. I.E. ANY TEXT PRECEDED BY AN ASTERISK IN COLUMN 1, WILL BE IGNORED BY THE REPORT WRITER ON PRINTOUT.

DO NOT USE A RETURN MARKER ALONE IN A LINE UNLESS YOU INTEND THAT A LINE FEED SHOULD BE SENT TO THE PRINTER.

USE 'S' IN COLUMN 1 TO SEPARATE GROUPS OF PROGRAM COMMANDS OR TEXT ON SCREEN WHEN MORE READABILITY IS WANTED

ALWAYS INSERT A RETURN AT THE END OF EACH LINE. IF WORD WRAP OCCURS GO BACK AND INSERT THE RETURN ON THE LINE WILL BE OVERPRINTED.

I.E. NO LINE FEED COMMAND IS SENT BY WORD WRAPPED TEXT. ALTERNATELY IF YOU NEED PRINTOUT LONGER THAN 80 COLUMNS WORD WRAPPED TEXT WILL PRODUCE IT.

SES

margins. The result of the more flexible approach taken by the more expensive packages is that you can simulate an existing paper record, with which people may be familiar already.

Despite the simple input capability of the Acornsoft database it is effective and easy to use. When you remember the limitations of View in terms of using long fields as "macros", this database offers all you will need for storing names, addresses and other non-textual data.

Stardatabase treats the field with the lowest ASCII code as the keyfield. This means that a field identified by the field tag Address1 has a lower ASCII value than a field tag Name or Address2. Figures come before alpha characters — upper and lower case letters — in the ASCII table and you can force the program to treat the Name field tag as the keyfield by calling it OName.

Using easily identifiable field names is important because Stardatabase expects you to know the field name — not the field code displayed on the screen — when you set up a search pattern or a sort list.

In contrast, Datagen permits you to search or sort on any field by specifying the number of the field in the search line. The following line will search for a named person "George Sanderson" in field number one:

F1="George Sanderson"

If one or more records are found in which "George Sanderson" is the string of characters in F1, markers identifying the records will be placed in the search level that you have selected. You can search for an exact match or something that approximates to what you are looking for in one or all the fields in the database using the search filter:

FK="Landerf"

where the left hand FK searches all the fields and the right hand expression will find the string "Lander" in Lander, Sanderson, Anderson, Landerfield and so on. Datagen has the most powerful search facilities of all the databases I have examined and while Datagen is not the speediest database when it is actually calculating and computing, it gains heavily in terms of the time it will take you to formulate your search and carry it out.

Searching a record set

In other words the design of Datagen, far from perfect as it is, more than makes up for its comparatively leisurely performance in this area. Curiously, the Acornsoft database seems to me to be the next most useful program in terms of ease of searching a set of records. There is no multiple level search facility in the Acornsoft program but the fuzzy search facilities are a good match for those in Datagen. Sx makes you carry out serial searches, progressively refining a subset of records from the main database, until you arrive at the

specification that you require.

There is no real disadvantage in this method but Sx has been so precisely designed that the repeated operations become tedious. Remember that this is the database that I have chosen for routine use at work because it provides the optimum performance for the tasks that I wish to have done on the BBC computer.

I do wish, however, that the designer of Sx had studied the humans who use his program. In their sloppy way they want to simply find someone or something as quickly as possible with as few keystrokes as possible.

Having to go to the Search sub-menu, clear the current subset to zero records, decide which field the person or object will occur in, remember the names of the fields without being able to display them on screen — was it Key or Keywords or Keyword — carry out the search, return to the main menu and select browse or amend mode before finally displaying the required information is unnecessarily complicated.

Datagen can also export data to View and Wordwise but if you want to insert the name of a book, a sentence or some other information that may vary in length into a line of text I think you would have to spool the completed printout to disc and then load it back into View in order to reformat the text before it could be printed properly.

Datagen is a complete package which contains little information about the possibilities of accessing data in a database using any program other than the facilities in the program Rom.

The Merlin database has a sophisticated report writing package available on disc and this method of producing software — core program in Rom and utilities and extensions on disc — seems to offer a very good combination. The Report Writer section of the program is new and will take some time to access in depth.

Nevertheless, if you need to handle paragraphs of text in a card index type of database, and if you need to set up routine searches that lead to predetermined and complex reports then the Merlin database may be just what you are looking for. Certainly none of the others will fill these needs as well.

Sx has several attractive features. The program is supplied with information about a

large number of very useful procedures and "Sx" calls for accessing the data in a Sx file. At the same time you should be aware that the Basic software supplied with the Sx chip is not error free.

If you try to add a page header to a report form from disc you are rewarded with a persistent error message. Other combinations of circumstances cause the utility software to hang up, but at least it is written in common or garden Basic and you can have a crack at correcting it, or modifying it to your particular needs.

Set against that, the Report Writer language for the Merlin package is compiled and enables you to produce a reporting program that cannot be easily deciphered by users who purchase a system from you.

Datagen has the best financial facilities of all the packages and Sx has potentially the worst because it handles all numbers as strings, rather than integers or real numbers, and, consequently, has no data validation. Additionally, Sx won't even search on the full six figures needed to describe a unique data in the twentieth century.

Data manipulation

You will need to read the Datagen manual carefully to appreciate the potential that it has for sophisticated numerical data manipulation. You will need to read the Datagen manual carefully to get much information from it. Written by the author of the program and one other person, it is a masterpiece of compact information leading to subtle confusion.

In all the discussion about the expensive systems it is very easy to overlook the cheap but capable Acornsoft packages; probably for just that reason — it's cheap. If you can cope with seven letter field titles, a very slow sort function, the limitations of data export to View — shared with other database programs — and the obvious problems of swapping program and data discs if you have only one disc drive, then the Acornsoft program offers stunningly good value for money.

The data on a disc is organised in such a way as to make it accessible to Basic programs, the search facilities are good, the manual is far more helpful than those supplied with the View wordprocessor and it's a pleasant and effective package to use.

Figure 2: Datagen — Data input card

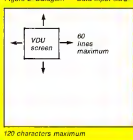
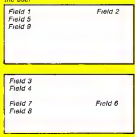


Figure 2a: Merlin DataScribe database. Multiple input screens with fields placed in the order of input most convenient to the user.



Julian Wood climbs to success by avoiding invaders and a beefburger in baps.

```

100 FOR A=27000 TO 32000 STEP 5
110 PRINT A, " ", LET C=0 FOR B=0 TO 4
120 INPUT M IF N=0 OR N=255 THEN
    ENDEE B, 5, 10 GO TO 180
130 POKE A+B, B PRINT TAB 6;B+4
140 PEK 12+B, LET C=C+PEK 12+B
NEXT B
150 INPUT M IF R=5 THEN DEER
160 PRINT "GO TO 110"
170 PRINT TAB 25; "I, E, I". NEXT

```

```

10: PAPER @ INK @ BORDER @ C
LEAD 25000 PRINT PAPER 1, INK 7
BRIGHT 1, FLASH 1, AT 11.4, -- TO
THE TOP" IS LOADING
26 LORD -- CODE BANGCHIZE USA
26397

```

To enter the game, first type in the machine-code loader in listing 23, with which you can enter all the machine code in listing 1. With listing 1, in the left-hand column are the memory address, and in the right hand column are the checksum values. Enter the five codes in between, and then the checksum value for that line.

When you have entered all the 5400 bytes of machine code, and are satisfied that all is correct, type New after entering
CLEAR 26999

SAVE "TO THE TOP" LINE 0:
SAVE "C" CODE 27000,5400
Verify, and you are then ready to play.

00000	17	15	1	27	122	1180
00001	17	15	1	27	122	1180
00002	17	15	1	27	122	1180
00003	17	15	1	27	122	1180
00004	17	15	1	27	122	1180
00005	17	15	1	27	122	1180
00006	17	15	1	27	122	1180
00007	17	15	1	27	122	1180
00008	17	15	1	27	122	1180
00009	17	15	1	27	122	1180
00010	17	15	1	27	122	1180
00011	17	15	1	27	122	1180
00012	17	15	1	27	122	1180
00013	17	15	1	27	122	1180
00014	17	15	1	27	122	1180
00015	17	15	1	27	122	1180
00016	17	15	1	27	122	1180
00017	17	15	1	27	122	1180
00018	17	15	1	27	122	1180
00019	17	15	1	27	122	1180
00020	17	15	1	27	122	1180
00021	17	15	1	27	122	1180
00022	17	15	1	27	122	1180
00023	17	15	1	27	122	1180
00024	17	15	1	27	122	1180
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00044	17	15	1	27	122	1180
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00047	17	15	1	27	122	1180
00048	17	15	1	27	122	1180
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00050	17	15	1	27	122	1180
00051	17	15	1	27	122	1180
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00065	17	15	1	27	122	1180
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00068	17	15	1	27	122	1180
00069	17					

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00417	01	130	131	132
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00495	207	208	209	210
00496	208	209	210	211
00497	209	210	211	212
00498	210	211	212	213
00499	211	212	213	214

200778	91	18	893	35	20	(2077)
200779	91	18	893	35	20	(874)
200780	91	18	893	35	20	(753)
200781	91	18	893	35	20	(825)
200782	123	37	111	254	8	(323)
200783	91	18	893	35	20	(826)
200784	91	18	893	35	20	(108)
200785	91	18	893	35	20	(73)
200786	91	18	893	35	20	(164)
200787	91	18	893	35	20	(208)
200788	91	18	893	35	20	(11)
200789	91	18	893	35	20	(58)
200790	91	18	893	35	20	(112)
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200792	91	18	893	35	20	(728)
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200795	91	18	893	35	20	(475)
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200827	91	18	893	35	20	(430)
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200830	91	18	893	35	20	(430)
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200834	91	18	893	35	20	(430)
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200841	91	18	893	35	20	(430)
200842	91	18	893	35	20	(430)
200843	91	18	893	35	20	(430)
200844	91	18	893	35	20	(430)
200845	91	18	893	35	20	(430)
200846						

(continued on next page)

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just left is not destroyed. Your objective is to reach the bomb, collecting bonus flags on the way, so that you can defuse the bomb before its timer runs out, and it comes to get you.

If you run into Gruesome Gandy on the way your nose will immediately seize up and he will crush your head. All this is done behind a cloud.

If you do manage to defuse the bomb it will be replaced by another for you to defuse. After you have defused five bombs you move onto the bonus screen (qv).

While you guide Martin past Gandy, you must avoid the deadly Gandyish traps, the dreaded Ken-and-Shrimp bones. An added feature of this version is that you can — theoretically — scroll the row to your advantage. I say theoretically, because it takes quite a bit of practice. Remember, when scrolling, the squares are deadly, as are Ken-and-Shrimp bones to poor little Martin. Study the scrolling

pattern — ie. have a practice on level 1 — so that you learn how to scroll without killing yourself. Helpful keys are:

F3 — Music on/off

F5 — Pause/Unpause

Shift F7 — Abort game and return to title screen.

Commodore E — Stop game, return character set to normal, turn off sprites — I used it when debugging my program, you may find it useful.

If you find yourself stuck, you can press the warp button. But beware — it may transport you to your death, since Martin's warp facility has been malfunctioning ever since Gandy met him on a hot summer's day. Your warp machine can only work for a certain number of times per level — this is shown as a yellow bar at the top of the screen. Your time is the red bar at the bottom. Once this has run out,

you are on your own until you complete that level.

When you have defused five bombs, you move onto the bonus screen, where you must try and get the flag — this is not always possible! Because sprites are used, you must aim towards the left of the flag — sometimes, you can lose your bonus because you are one pixel to the left.

Press a key to start and press it once again to start your descent. The quicker you do it, and the higher the level, the bigger the bonus you will receive. After this screen, the skill level is incremented, and you go back to the first screen.

Finally, if you don't/can't type this program in, but would like a copy of it on tape, send a cheque/postal order for £2.50 made out to R. Hammer to Deathtrap 64 Office, 26 St. Barnabas Road, Emmer Green, Reading RG4 8RA.

(program 5 and 6 on page 78)



Program 3.

```

10 L=1:1:1000000
20 IF L=1 THEN GOTO 100
30 IF L=1 THEN GOTO 100
40 IF L=1 THEN GOTO 100
50 IF L=1 THEN GOTO 100
60 IF L=1 THEN GOTO 100
70 IF L=1 THEN GOTO 100
80 IF L=1 THEN GOTO 100
90 IF L=1 THEN GOTO 100
100 IF L=1 THEN GOTO 100
110 IF L=1 THEN GOTO 100
120 IF L=1 THEN GOTO 100
130 IF L=1 THEN GOTO 100
140 IF L=1 THEN GOTO 100
150 IF L=1 THEN GOTO 100
160 IF L=1 THEN GOTO 100
170 IF L=1 THEN GOTO 100
180 IF L=1 THEN GOTO 100
190 IF L=1 THEN GOTO 100
200 IF L=1 THEN GOTO 100
210 IF L=1 THEN GOTO 100
220 IF L=1 THEN GOTO 100
230 IF L=1 THEN GOTO 100
240 IF L=1 THEN GOTO 100
250 IF L=1 THEN GOTO 100
260 IF L=1 THEN GOTO 100
270 IF L=1 THEN GOTO 100
280 IF L=1 THEN GOTO 100
290 IF L=1 THEN GOTO 100
300 IF L=1 THEN GOTO 100
310 IF L=1 THEN GOTO 100
320 IF L=1 THEN GOTO 100
330 IF L=1 THEN GOTO 100
340 IF L=1 THEN GOTO 100
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450 IF L=1 THEN GOTO 100
460 IF L=1 THEN GOTO 100
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710 IF L=1 THEN GOTO 100
720 IF L=1 THEN GOTO 100
730 IF L=1 THEN GOTO 100
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750 IF L=1 THEN GOTO 100
760 IF L=1 THEN GOTO 100
770 IF L=1 THEN GOTO 100
780 IF L=1 THEN GOTO 100
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800 IF L=1 THEN GOTO 100
810 IF L=1 THEN GOTO 100
820 IF L=1 THEN GOTO 100
830 IF L=1 THEN GOTO 100
840 IF L=1 THEN GOTO 100
850 IF L=1 THEN GOTO 100
860 IF L=1 THEN GOTO 100
870 IF L=1 THEN GOTO 100
880 IF L=1 THEN GOTO 100
890 IF L=1 THEN GOTO 100
900 IF L=1 THEN GOTO 100
910 IF L=1 THEN GOTO 100
920 IF L=1 THEN GOTO 100
930 IF L=1 THEN GOTO 100
940 IF L=1 THEN GOTO 100
950 IF L=1 THEN GOTO 100
960 IF L=1 THEN GOTO 100
970 IF L=1 THEN GOTO 100
980 IF L=1 THEN GOTO 100
990 IF L=1 THEN GOTO 100
1000 IF L=1 THEN GOTO 100

```



Program 4

```

10 DATA 9,FF,C8,20,C8,A0,4D,B1
20 DATA FB,C8,C8,91,FB,88,88,88
30 DATA CC,20,C8,D0,F2,EA,EA,EA
40 DATA EA,EA,EA,EA,EA,EA,EA,18
50 DATA 9,88,E5,FC,30,3A,18,EA
60 DATA 9,D4,65,FC,4C,5A,C8,A9
70 DATA 8E,A0,26,91,FB,C8,91,FB
80 DATA A0,28,91,FB,C8,91,FB,A9
90 DATA IF,91,FD,A9,1E,88,91,FD
100 DATA A0,00,A9,1C,91,FD,C8,A9
110 DATA ID,91,FD,68,85,FC,4C,00
120 DATA C8,EA,EA,EA,EA,EA,EA,EA
130 DATA 9,D4,18,65,FE,85,FC,4C
140 DATA 2F,C8,00,02,02,00,00
150 DATA 9,50,8D,20,C8,A0,02,B1
160 DATA FB,88,88,91,FB,C8,C8,C8
170 DATA CC,20,C8,D0,F2,EA,EA,EA

```

```

170 DATA EA,EA,EA,EA,EA,EA,EA,18
180 DATA 9,08,E5,FC,30,3A,18,EA
190 DATA 9,D4,65,FC,4C,5A,C8,A9
200 DATA 8E,A0,26,91,FB,C8,91,FB
210 DATA A0,4E,91,FB,C8,91,FB,A9
220 DATA IF,91,FD,A9,1E,88,91,FD
230 DATA A0,26,A9,1C,91,FD,C8,A9
240 DATA ID,91,FD,68,85,FC,4C,70
250 DATA C8,EA,EA,EA,EA,EA,EA,EA
260 DATA 9,D4,18,65,FE,85,FC,4C,9F,C8
500 R=0:GOTO 17:READ R:L=LEFT$(R$,1):
R$=RIGHT$(R$,1):L=ASC(L$):R=ASC(R$)
510 IF L>64 THEN L=55:GOTO 17
520 L=L-48
530 IF R>64 THEN R=55:GOTO 17
540 R=R-48
550 X=(L*16)+R:POKE 51200+T,X:NEXT
1000 LOAD

```

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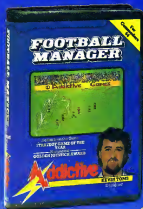


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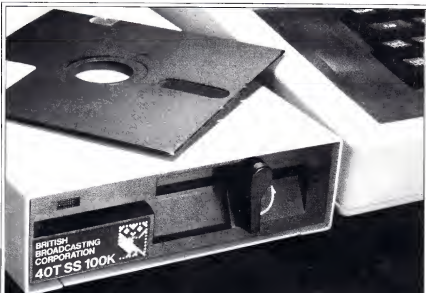
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(VC7)

SWITCH ON your 64; the screen memory starts at 1024 — hex 0400 — so that, for example, POKE 1024,1

puts an A in the extreme top-left corner — older 64s may need colour Ram to be poked too. Right? For most purposes, this is assumed to be a fixed feature of the 64.

What's less well known is that the screen can be repositioned through most of the machine's 64K of Ram. The diagram shows the normal situation, with about 39000 bytes of Basic positioned between the top of the screen — \$08000 — and Rom at \$A000. But we can move the screen, in minimum steps of \$0400, anywhere in memory.

Screens under Rom

Some locations aren't suitable, as machine-language programmers will appreciate — for example the zero-page, at the very start of memory, cannot be used as a normal screen. My example puts screens under Rom, partly because many programmers don't know how to

MOVING SC

Rae West explains a routine which will switch between screens for animation or Help pages.

use this area (machine language is usually needed, so it's usually free, and partly to avoid the complication of altering Basic pointers to prevent programs overlapping the screen area.

"Moving the screen" — what does this mean? Nothing to do with the TV! — we want commands like Print and keys like CLR to

work normally, but to have freedom to alter the actual position in memory that screen information is stored. If we do the job properly, most things will be unaltered, but Pokes to screen, if used, will be different — the addresses will be much larger than usual since the screen Ram is higher up.

Before we continue, it makes sense to ask why anyone should want to move the screen around. In fact, there are several tricks we can perform with this method, which are impossible otherwise:

- We can switch between screens at will. For example, a Help screen might be permanently set up; a keypress would allow instantaneous switching between conventional processing and such a screen.

- Animation is another possibility: there's room for 16 screens in Bank 1, plus 12K of Basic below them, enough for attractive animation of the piston-engine demo type.

- Screens of user-defined graphics and normal characters can be alternated.

Using interrupt techniques, we can mix screens on the same display.

Attractive patterns

My demonstration program puts four user-defined characters in Ram; these are designed to fit together to produce attractive patterns. The program uses two screens — Apple users will know the kind of thing — Apple has two alternate screens. It fills one screen, displays it, then repeats with the other, so there's no delay while one pattern is overwritten with the next. The result is quite impressive.

Vic-II is the key to the action, and it's necessary to get several things right, which is why the technique isn't too simple. As the diagram shows, Vic-II can be programmed to process only a quarter of the 64's memory at one time. All the character definition information — i.e. patterns of 8 by 8 dots — and the screen Ram, and sprite information must be stored within this 16K. The only exception is the 64's Rom character set, which is wired up to override this requirement.

Moving the screen

So, to move the screen under Rom, we must (i) Set Vic-II to bank 2 or 3; (ii) Set Vic-II to read the character set we want; and (iii) ensure Basic writes to our new screen. This last item

Figure 1.

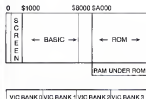


Table 1.

Usable Character Definition and Screen Combinations

Vic Bank 0: selected with POKE 56576/(PEEK(56576)AND 252) OR 3 (DEFAULT) (usual value is 151)

Start of Screen Memory	POKE 648** with	Start of Graphics Character Memory						
		ROM char set		8291*	10240	12288	14336	
		U.CASE 4096	L.CASE 6144					
		2048						
		POKE 53272 with:						
1024	4	19	21	23	25	27	29	31
2048	8	35	37	39	41	43	45	47
3072	12	51	53	55	57	59	61	63
The screen cannot be placed at 4096-8191, as the Vic sees character ROM here.								
8192	32	131	133	135	137	139	141	143
9216	36	147	149	151	153	155	157	159
10240	40	163	165	167	169	171	173	175
11264	44	179	181	183	185	187	189	191
12288	48	195	197	199	201	203	205	207
13312	52	211	213	215	217	219	221	223
14336	56	227	229	231	233	235	237	239
15360	60	243	245	247	249	251	253	255

The screen cannot be placed at 4096-8191, as the Vic sees character ROM here.

8192	32	131	133	135	137	139	141	143
9216	36	147	149	151	153	155	157	159
10240	40	163	165	167	169	171	173	175
11264	44	179	181	183	185	187	189	191
12288	48	195	197	199	201	203	205	207
13312	52	211	213	215	217	219	221	223
14336	56	227	229	231	233	235	237	239
15360	60	243	245	247	249	251	253	255

*Starred columns correspond to bit-map graphics

**Not needed with bit-map graphics.

Vic Bank 1: selected with POKE 56576/(PEEK(56576)AND 252) OR 2 (usual value is 150)

Start of Screen Memory	POKE 648 with	Start of Graphics Character Memory							
		16384*	18432	20480	22528	24576*	26624	28672	30720
		POKE 53272 with:							
16384	64	1	3	5	7	9	11	13	15
17408	68	17	19	21	23	25	27	29	31
18432	72	33	35	37	39	41	43	45	47
19456	76	49	51	53	55	57	59	61	63
20480	80	65	67	69	71	73	75	77	79
21504	84	81	83	85	87	89	91	93	95
22528	88	97	99	101	103	105	107	109	111
23552	92	113	115	117	119	121	123	125	127
24576	96	129	131	133	135	137	139	141	143
25600	100	145	147	149	151	153	155	157	159
26624	104	161	163	165	167	169	171	173	175
27648	108	177	179	181	183	185	187	189	191
28672	112	193	196	197	199	201	203	205	207
29696	116	209	211	213	215	217	219	221	223
30720	120	225	227	229	231	233	235	237	239
31744	124	241	243	245	247	249	251	253	255

20480	80	65	67	69	71	73	75	77	79
21504	84	81	83	85	87	89	91	93	95
22528	88	97	99	101	103	105	107	109	111
23552	92	113	115	117	119	121	123	125	127
24576	96	129	131	133	135	137	139	141	143
25600	100	145	147	149	151	153	155	157	159
26624	104	161	163	165	167	169	171	173	175
27648	108	177	179	181	183	185	187	189	191
28672	112	193	195	197	199	201	203	205	207
29696	116	209	211	213	215	217	219	221	223
30720	120	225	227	229	231	233	235	237	239
31744	124	241	243	245	247	249	251	253	255

REENS



relies on location 648.

PRINT PEEK (648)

usually returns 4, showing the screen starts at \$0400.

Memory arrangements

Table 1 — which, so far as I know, hasn't been printed before — summarizes the 64's screen memory arrangements. You should be able to see from it that my example puts character definitions from 49152 onwards, and uses two screens, starting at 50176 and 51200, which it switches between. While Print takes place, the "wrong" value of 648 is used, which makes the 64 display the alternative screen.

Incidentally, sprites are usable with this method; sprite pointers are hidden away just above the screen, so when a screen is moved these pointers shift too. One final word: when experimenting, Stop-Restore won't change location 648. So if your cursor seems to have vanished, try

POKE 648,4

to return to normal.

Vic Bank 2: selected with POKE 58576/(PEEK(58576)AND 252) OR 1
(usual value is 149)

Start of Graphics Character Memory											
Start of Screen Memory	POKE 648 with	ROM char set U.CASE L.CASE									
		32768*	34816	36864	38912	40960*	43008	45056	47104		
POKE 53272 with:											
32768	128	1	3	5	7	9	11	13	15		
33792	132	17	19	21	23	25	27	29	31		
34816	136	33	35	37	39	41	43	45	47		
35840	140	49	51	53	55	57	59	61	63		

The screen cannot be placed at 36864-40960, as the Vic sees character Rom here. Above this point in this bank, Ram and Basic Rom co-exist in the memory map, the Vic "sees" the Rom, not the Ram, but the routines that perform screen operations need to read from screen Ram; they can't do so, in this region, without first switching out the Roms and switching in the Ram. This isn't normally done — it can only be done if Basic is not in use. So this area cannot effectively be used for screen Ram. Note, however, that it can be used to store character definitions, since these don't need to be read back, as the Vic chip will read these from Ram while the 6510 reads instructions from the parallel Rom containing Basic.

Vic Bank 3: selected with POKE 58576/(PEEK(58576)AND 252)
(usual value is 148)

Note: only the region of memory \$C000-\$CFFF (49152-53247) can be used as screen RAM: see the comments above.

Start of Graphics Character Memory											
Start of Screen Memory	POKE 648 with	Caution IO chips									
		49152*	51200	53248	55296	57344*	59392	61440	63488		
POKE 53272 with:											
49152	192	1	3	5	7	9	11	13	15		
50176	196	17	19	21	23	25	27	29	31		
51200	200	33	35	37	39	41	43	45	47		
52224	204	49	51	53	55	57	59	61	63		

- To use these tables:
- To determine screen start and graphics definition start, Peek contents of 648 and 53272, then refer to the table. Example: when 648 contains 140 and 53272 contains 53, screen Ram starts at 35840 and Rom characters at 36864. Bank 2 is in use; this can be deduced from the position of screen Ram given in 648.
 - To set screenstart and graphics definitions, Poke all three parameters, unless already set. Example: POKE 58576, (PEEK(58576)AND 252) OR 2: POKE 648, 120: POKE 53272, 252 selects bank 1, puts screen at 30720 and chooses user-definable characters at 28672. In Basic, POKE 56,28672/256: CLR or POKE 56,112: CLR lowers the top of Basic to protect the definitions and screen.
 - To move the normal character definitions, use POKE 56333, 127: POKE 1, 51 followed by a loop to transfer 53248/57343 (or a subset) to the new position, then POKE 1, 55: POKE 56333, 129. All this must be in program mode. This method is easier than defining all the characters from scratch.
 - The Vic-II's bank-switching forces both screen and character definitions to coexist in the same quarter of the 64's memory map. It's perfectly OK to start the screen up at 49152, and store character definitions in the Ram from 61440, say, taking nothing from Basic. Many character sets can be stored simultaneously, in fact.

Rae West has written a 600 page reference book, *Programming the Commodore 64*, recently published by Level Ltd. It is obtainable from booksellers or by mail from Biblios Distribution, Star Road, Parting Green, Nr Horsham, W. Sussex at £14.90 plus £1 post.

Demo program:

```

0 REM *** YOUR COMPUTER - DEMONSTRATION OF TWO C64 SCREENS ***
10 POKE 56576,148 : REM VIC BANK 3
20 SF="ABCD" : REM 4 CHARACTERS
30 FOR J=49152 TO 49183: READ X: POKE J,X: NEXT: REM SET UP USER DEFINED CHARS
40 DATA 36,36,255,0,0,255,36,36
50 DATA 36,36,231,36,36,231,36,36
60 DATA 36,18,9,132,66,33,144,72
70 DATA 36,72,144,33,66,132,9,18
80 REM **** NOW WE DISPLAY ONE SCREEN, WHILE WRITING TO THE OTHER:- ****
100 GOSUB 1000: POKE 53272,17: POKE 648,200: REM ONE SCREEN ...
110 GOSUB 1000: POKE 53272,33: POKE 648,196: REM ... OTHER SCREEN!
120 GOTO 100
999 REM **** MAKE A RANDOM STRING OF LENGTH 9 FROM THE 4 CHARACTERS:- ****
1000 :S="":FOR J=1 TO 9: L=RND(1)*4+1
1010 :S=X+MID$(SF,L,1):NEXT
1020 PRINT "S:";FOR J=1 TO 11: PRINT "S: ";NEXT
1030 RETURN
    
```

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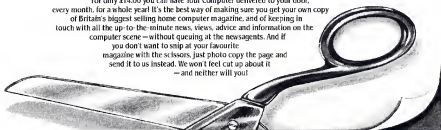
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or more blocks in one straight line, you get a bonus of 100time left, and when time reaches zero, you move on to the next sheet. In total there are four different sheets. When you see one of lives, the game ends. You can also stop the game by pressing Break. If the high-score is beaten, the computer will ask you to enter your name - don't forget to press Newline. Answering the question "another game?" with N will bring you back to the title screen.

If you don't feel up to the task of typing in the listings, or you cannot manage to get the program to work — not very likely — the game is available on a fresh cassette tape for 700 — Dutch guilders, or £3 — from Miquel Van Smoorenburg, 20 Baljuwstraat, 2461 al Texel, Holland.

max dump on next page

```

50 SAVE "PONS."
10 POKE 16508+3
20 POKE 1680
30 LIST 4000
40 RAND USA 17971
50 REM +DONT FORGET THIS LINE+
60 REM
100 REM ONLY ENTER THE FOLLOW
ING LINES IF YOU WANT TO DEFINE
YOUR OWN SHEETS.
210 LET A$ = "XXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXX"
220 PRINT AT 0,0,A$:AT 21,0,A$
230 FOR X=1 TO 20
240 PRINT AT X,0,"XXXXXXXXXXXXXXXXXX
XXXXXXXXXX"
250 NEXT X
260 LET P=PEEK 16396+PEEK 16397
+256+3
270 LET P1=P
280 LET K$=INKEY$
290 LET A=P+(K$="8")-1+(K$="5")+3
300 IF PEEK P=136 THEN LET P=P1
310 POKE P1,0
320 IF K$="0" THEN GOTO 250
330 POKE P,165
340 GOTO 170

```

```

1250 INPUT A
1260 IF A.1 OR A>4 THEN GOTO 250
1270 READ A
1280 LET A=USR 17974
1290 LET X=1
1300 LET Y=1
1310 LET A$=""
1320 PRINT AT X,Y
1330 FOR N=1 TO 4
1340 PRINT A$ AT X,Y
1350 LET A$=CHR$(PEEK (PEEK 163
9 1360 BEEK 16399)+255))
1370 PRINT " " AT X,Y
1380 LET K$=INKEY$
1390 LET X=X+K$="6" AND X*20)-1
1400 LET Y=Y+K$="8" AND Y*20)-1
1410 IF "1" AND X=1
1420 IF "2" AND Y=1
1430 IF "3" THEN GOTO 310
1440 POKE A,K
1450 POKE A+1,Y
1460 LET A=A+2
1470 LET A$=""
1480 IF INKEY$="" THEN GOTO 405
1490 NEXT N
1500 PRINT AT X,Y,A$
1510 PRINT AT 21,3,"READ/"
1520 -----
1530 IC: MIQUEL VAN SMOEDENBURG
1540 JANUARI-FEBRUARI 1985.

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Program 1

```

10 REM *****
20 REM ***** BACK UP UTILITY *****
30 REM ***** J. K. LASLETT 1985 *****
40 REM *****
50 ON ERROR GOTO 999
60 LW 0,0:DN 1,250:BP 2,64:TP 3,75
70 BORDER WUPPDS:RUPFN 11:OPGIN 0,0:CLS
80 LOCATE 1,25:PRINT"LOADING PLEASE WAIT!"
90 REM *****
100 PLOT 120,90:DRAW 130,100,1:DRAW 170,100:DRAW 170,0
110:DRAW 250,90:DRAW 250,0:DRAW 250,0:DRAW 170,77:DRAW
120,77:DRAW 250,78:DRAW 210,70:DRAW 210,0:DRAW 250,0
130:DRAW 250,62:DRAW 200,62:DRAW 200,50:DRAW 190,50:DRAW
140,40:DRAW 180,40:DRAW 180,70
150:DRAW 170,70:DRAW 170,60:DRAW 140,60:DRAW 140,90:DR
160,100:DRAW 150,90:DRAW 140,80:DRAW 140,70:PLOT 140
170,90:DRAW 170,90:PLOT 170,90:DRAW 180,90:DRAW 180,77:DR
190,77:DRAW 170,78:DRAW 170,70:DRAW 200,60:DRAW 210,50:DR
220,50:DRAW 200,77:DRAW 200,60
230: PLOT 190,90:DRAW 190,60:PLOT 220,90:DRAW 220,60:PL
240,140,90:DRAW 120,90
250: REM *****
260 PLOT 200,90:DRAW 240,90:DRAW 340,60:DRAW 330,60:DR
270,510,90:PLOT 310,90:DRAW 400,60:DRAW 380,60:DRAW 390
280,90:DRAW 290,90:DRAW 280,90:DRAW 280,90:PLOT 320,90:DR
290,330,90:DRAW 330,77:DRAW 320,77:DRAW 320,60
300: REM *****
310 PLOT 340,100:DRAW 410,100:DRAW 410,90:DRAW 490,90
320:DRAW 490,60:DRAW 480,60:DRAW 470,77:DRAW 460,77:DR
330,70,70:DRAW 470,70:DRAW 470,67:DRAW 490,67:DRAW 490,60
340:DRAW 440,60:DRAW 440,50:DRAW 430,50:DRAW 430,40:DR
350,40:DRAW 420,70:DRAW 410,70
360: DRAW 410,60:DRAW 480,60:DRAW 480,90:DRAW 390,90:DR

```

```

370,90:DRAW 380,60:DRAW 380,90:DRAW 340,90:DRAW 340
380:PLOT 400,90:DRAW 410,90:PLOT 410,90:DRAW 420,90:D
390,420,77:DRAW 410,77:DRAW 410,0:DRAW 420,90:DRAW 43
40,60:PLOT 460,90:DRAW 460,60
410: PLOT 440,0:DRAW 450,0:DRAW 450,77:DRAW 440,77:DR
460,440,00
470: REM *****CASSETTE*****
480: PLOT 90,70:DRAW 100,50:DRAW 290,370:DRAW 300,77
490:DRAW 300,210:DRAW 290,200:DRAW 180,200:DRAW 90,210:DR
500,90,320:PLOT 120,200:DRAW 120,270:DRAW 240,230:DR
510,220
520: PLOT 150,200:DRAW 150,220:DRAW 150,210:DRAW 150,21
530:DRAW 150,270:PLOT 240,220:DRAW 240,210:DRAW 230,210
540:DRAW 272,220:DRAW 240,220:PLOT 170,207:DRAW 220,207:DR
550,220,270:DRAW 170,270:DRAW 170,0
560: PLOT 320,220:DRAW 340,370:DRAW 370,370:DRAW 340,37
570:DRAW 340,210:DRAW 310,200:DRAW 340,200:DRAW 340,210
580:DRAW 310,200:PLOT 340,200:DRAW 370,230:DRAW 380,230:DR
590,310,0:DRAW 390,220:DRAW 390,200:DRAW 390,210:DR
600,210:DRAW 290,220
610: PLOT 400,220:DRAW 400,217:DRAW 472,217:DRAW 472,22
620:DRAW 460,220:PLOT 410,207:DRAW 460,207:DRAW 440,270
630:DRAW 410,270:DRAW 410,207
640: PLOT 180,210:DRAW 110,210:DRAW 280,210:DRAW 290,
650:DRAW 240,240:DRAW 100,240:DRAW 100,210:PLOT 340,21
660:DRAW 320,210:DRAW 320,200:DRAW 310,210:DRAW 310,240
670,240,400:DRAW 400,310
680: PLOT 140,200:DRAW 250,250:PLOT 250,400:DRAW 140,26
690:PLOT 360,290:DRAW 490,290:PLOT 490,260:DRAW 140,260
700: REM *****
710: PLOT 70,0:DRAW 70,0:DRAW 60,300:DRAW 60,300:DRAW 70,390
720:DRAW 100,70:DRAW 110,60:DRAW 110,70:DRAW 100,740:DR
730,70,740:PLOT 100,750:DRAW 60,750:DRAW 70,760:DRAW 70
740:DRAW 00,300:DRAW 100,300:DRAW 100,370

```

AMSTRAD TAPE BACK UP

HOW MANY times have you sat there waiting for what seems to be forever for a program to Load? Well type in this program and make back up copies of your slow loading software that will then Load at twice the normal speed. Alternatively, just make security copies in the reliable normal speed.

A problem that I have encountered with the Amstrad is the way in which the speed of cassette mechanisms vary from machine to machine. Some software will only successfully load one in three attempts which is another reason for making one or maybe two back up copies of that brand new game.

Software recorded on your machine will always be pin sharp and reliable to load successfully even at the fast rate. I generally make two copies of my valuable software, one on a C15 at the fast rate and the other on a C90 at normal speed, just in case.

To use the program type in program 1, check it and save it to tape with

SAVE "AMSTRAD BACK UP"

Now type in program 2, check it and again save it to tape with

SAVE "AMSTRAD BACK UP"

Lastly, type in program 3. Before running save the Basic to another cassette with

SAVE "Data"

Check it carefully then Run it. Insert your first tape with the first two programs on and Save the resulting code.

Reset computer with Ctrl/Shift/Escape. Rewind tape press Ctrl/small Enter and the program will auto run

The program is user-friendly in that not many instructions are necessary. If all goes well in the loading the computer will beep at you, and ask Save Speed, just press 1 for Fast or 0 for

Normal. You will now be presented with Press Play then any key: which is the standard message you see when you load any program. So why not rewind this tape and make a back up copy of this program just to test it? It copies a program section by section. This program is

made up of three sections

1st section 3 blocks

2nd section 1 block

3rd section 1 block

If all is going well, the bottom of the screen should read Loading Amstrad Back Up Block

KR Laslett with a quick and easy way to take extra copies of precious programs.



```

200 DRAW 180,170:DRAW 80,140:DRAW 180,140:DRAW 180,170
210 PLOT 120,140:DRAW 120,170:DRAW 180,170:DRAW 180,140,180,170
220 PLOT 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170
230 PLOT 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170
240 PLOT 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170
250 PLOT 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170
260 PLOT 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170
270 PLOT 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170
280 PLOT 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170
290 PLOT 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170
300 PLOT 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170
310 PLOT 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170
320 PLOT 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170
330 PLOT 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170
340 PLOT 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170
350 PLOT 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170
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370 PLOT 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170
380 PLOT 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170
390 PLOT 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170
400 PLOT 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170
410 PLOT 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170
420 PLOT 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170
430 PLOT 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170
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770 PLOT 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170
780 PLOT 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170
790 PLOT 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170
800 PLOT 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170
810 PLOT 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170
820 PLOT 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170
830 PLOT 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170
840 PLOT 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170
850 PLOT 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170
860 PLOT 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170
870 PLOT 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170
880 PLOT 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170
890 PLOT 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170
900 PLOT 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170
910 PLOT 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170
920 PLOT 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170
930 PLOT 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170
940 PLOT 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170
950 PLOT 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170
960 PLOT 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170
970 PLOT 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170
980 PLOT 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170
990 PLOT 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170:DRAW 180,170

```

```

DRAW 200,150
370 REM *****CIRCLE*****
380 PLOT 200,200:DRAW 200,200,200,200
390 FOR A=0 TO 67:DO:ORIGIN 245,275:PLOT 16*COS(A),16
400 GOTO NEXT:ORIGIN 0,0
410 FOR A=202 TO 360:DO:ORIGIN 245,275:PLOT 16*COS(A),16
420 GOTO NEXT:ORIGIN 0,0
430 FOR A=0 TO 67:DO:ORIGIN 405,275:PLOT 16*SIN(A),16
440 GOTO NEXT:ORIGIN 0,0
450 FOR A=202 TO 360:DO:ORIGIN 405,275:PLOT 16*SIN(A),16
460 GOTO NEXT:ORIGIN 0,0
470 FOR A=112 TO 257:DO:ORIGIN 145,275:PLOT 16*COS(A),16
480 GOTO NEXT:ORIGIN 0,0
490 FOR A=112 TO 257:DO:ORIGIN 385,275:PLOT 16*COS(A),16
500 GOTO NEXT:ORIGIN 0,0
510 FOR A=112 TO 257:DO:ORIGIN 145,275:PLOT 16*SIN(A),16
520 GOTO NEXT:ORIGIN 0,0
530 FOR A=112 TO 257:DO:ORIGIN 385,275:PLOT 16*SIN(A),16
540 GOTO NEXT:ORIGIN 0,0
550 FOR A=112 TO 257:DO:ORIGIN 145,275:PLOT 16*SIN(A),16
560 GOTO NEXT:ORIGIN 0,0
570 FOR A=112 TO 257:DO:ORIGIN 385,275:PLOT 16*SIN(A),16
580 GOTO NEXT:ORIGIN 0,0
590 FOR A=112 TO 257:DO:ORIGIN 145,275:PLOT 16*SIN(A),16
600 GOTO NEXT:ORIGIN 0,0
610 FOR A=112 TO 257:DO:ORIGIN 385,275:PLOT 16*SIN(A),16
620 GOTO NEXT:ORIGIN 0,0
630 FOR A=112 TO 257:DO:ORIGIN 145,275:PLOT 16*SIN(A),16
640 GOTO NEXT:ORIGIN 0,0
650 FOR A=112 TO 257:DO:ORIGIN 385,275:PLOT 16*SIN(A),16
660 GOTO NEXT:ORIGIN 0,0
670 FOR A=112 TO 257:DO:ORIGIN 145,275:PLOT 16*SIN(A),16
680 GOTO NEXT:ORIGIN 0,0
690 FOR A=112 TO 257:DO:ORIGIN 385,275:PLOT 16*SIN(A),16
700 GOTO NEXT:ORIGIN 0,0
710 FOR A=112 TO 257:DO:ORIGIN 145,275:PLOT 16*SIN(A),16
720 GOTO NEXT:ORIGIN 0,0
730 FOR A=112 TO 257:DO:ORIGIN 385,275:PLOT 16*SIN(A),16
740 GOTO NEXT:ORIGIN 0,0
750 FOR A=112 TO 257:DO:ORIGIN 145,275:PLOT 16*SIN(A),16
760 GOTO NEXT:ORIGIN 0,0
770 FOR A=112 TO 257:DO:ORIGIN 385,275:PLOT 16*SIN(A),16
780 GOTO NEXT:ORIGIN 0,0
790 FOR A=112 TO 257:DO:ORIGIN 145,275:PLOT 16*SIN(A),16
800 GOTO NEXT:ORIGIN 0,0
810 FOR A=112 TO 257:DO:ORIGIN 385,275:PLOT 16*SIN(A),16
820 GOTO NEXT:ORIGIN 0,0
830 FOR A=112 TO 257:DO:ORIGIN 145,275:PLOT 16*SIN(A),16
840 GOTO NEXT:ORIGIN 0,0
850 FOR A=112 TO 257:DO:ORIGIN 385,275:PLOT 16*SIN(A),16
860 GOTO NEXT:ORIGIN 0,0
870 FOR A=112 TO 257:DO:ORIGIN 145,275:PLOT 16*SIN(A),16
880 GOTO NEXT:ORIGIN 0,0
890 FOR A=112 TO 257:DO:ORIGIN 385,275:PLOT 16*SIN(A),16
900 GOTO NEXT:ORIGIN 0,0
910 FOR A=112 TO 257:DO:ORIGIN 145,275:PLOT 16*SIN(A),16
920 GOTO NEXT:ORIGIN 0,0
930 FOR A=112 TO 257:DO:ORIGIN 385,275:PLOT 16*SIN(A),16
940 GOTO NEXT:ORIGIN 0,0
950 FOR A=112 TO 257:DO:ORIGIN 145,275:PLOT 16*SIN(A),16
960 GOTO NEXT:ORIGIN 0,0
970 FOR A=112 TO 257:DO:ORIGIN 385,275:PLOT 16*SIN(A),16
980 GOTO NEXT:ORIGIN 0,0
990 FOR A=112 TO 257:DO:ORIGIN 145,275:PLOT 16*SIN(A),16

```

CKUP

I etc, to Block 3. Afterwards, automatically the computer responds with Press Rec and Play then any key, which instructs you to place your back up tape into the machine, press appropriate buttons and any key.

A powerful feature on this program is the Save again option which when your three blocks have been Saved should appear on the bottom of the screen. Simply press Y for yes or N for no. Upon pressing Y the section will be Saved again, on pressing N the program will go back to Press Play then any key in which case carry on with the next section etc.

The program as it stands will transfer a section up to about 22 blocks in length which in most cases will be sufficient. You should become accustomed to this program very quickly as it's very easy to use and the screen always tells you what's going on.

If you get the message "read error a" or a similar message which tells you there's a tape loading error, don't despair press Escape, rewind the tape and load the section again. I've tried to make the program as crash-proof as possible ie, if Escape is pressed during Loading the program will call a routine to reset the cassette manager and call the load routine once more.

If the program hasn't operated as described then re-load the machine code loader, if you save it separately on a tape — program 3 — and check the data carefully. Then re-Save the resultant code. Then try again.

If anybody doesn't want the task of typing in the program, tape copies are available with full instructions from: Mr. K.R. Laslett, 12 Wintour House, Loweswater Close, Wembley HA9 8UP at £3.00 per copy.

Program 2.

```

5 REM *****
10 REM ***** BASIC CONTROL PROGRAM *****
15 REM ***** K.R. LASLETT *****
20 REM *****
25 MEMORY 42999:LOAD""
30 WINDOW 1,40,24,25:CALL @BC65:CLS:PRINT CHR$(7):PRINT
1 INPUT SAVE SPEED":PRINT"0-NORMAL OR 1-FAST."
40 A$=INKEY$:IF A$="" GOTO 40
50 IF A$="1" THEN SPEED WRITE 1
60 CLS:PRINT CHR$(7):CALL 43000
70 CLS:PRINT CHR$(7):PRINT"SAVE AGAIN":PRINT"YES OR NO
80 B$=INKEY$:IF B$="" GOTO 80
90 IF B$="Y" OR B$="y" THEN 110
100 GOTO 60
110 CLS:PRINT CHR$(7):CALL @AB23:GOTO 70

```

Program 3

```

10 PGM MACHINE CODE LOADER
20 MEMORY 42999
30 FOR address=43000 TO 43095
40 READ byte:POKE address,byte
50 NEXT address
60 SAVE"AMSTRAD BACK UP",B,43000,96
65 END
100 DATA @06,@00,@21,@E8,@03,@11,@2B,@04
110 DATA @CD,@77,@BC,@D2,@4C,@AB,@22,@EA
120 DATA @03,@ED,@53,@EC,@03,@ED,@43,@EE
130 DATA @03,@32,@F0,@03,@21,@2B,@0C,@CD
140 DATA @B3,@BC,@D2,@4C,@AB,@22,@F1,@03
150 DATA @CD,@7A,@BC,@06,@10,@2A,@EA,@04
160 DATA @11,@2B,@04,@CD,@BC,@BC,@02,@52
170 DATA @AB,@22,@F3,@03,@21,@2B,@0C,@ED
180 DATA @5B,@EE,@03,@ED,@4B,@F1,@03,@3A
190 DATA @F0,@03,@CD,@9B,@BC,@D2,@52,@AB
200 DATA @CD,@BC,@C9,@CD,@CD,@7D,@BC,@C3
210 DATA @F3,@A7,@CD,@92,@BC,@C3,@F8,@A7

```

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730171	9536316730280378	7791	3371094	0116800000000000	577	335778	88F8E00000000000	782	336451	FE13A00000000000	780
730172	8707070101010101	918	3371095	0221000000000000	589	335779	89F13A0000000000	687	336452	400F000000000000	679
730173	010000100000000000	487	730174	7301740000000000	588	335780	90F13A0000000000	678	336453	0113A00000000000	780
730175	110100000000000000	672	730175	5414000000000000	250	335781	9102000000000000	679	336454	800F000000000000	619
730176	071000000000000000	756	33721	0016000000000000	579	335782	9203000000000000	680	336455	0022000000000000	781
730177	001300000000000000	090	730274	2914110000000000	507	335783	9304000000000000	785	336456	0022000000000000	1000
730178	000000000000000000	675	337275	7000100000000000	994	335784	9405000000000000	680	336457	0002000000000000	666
730179	000000000000000000	000	335345	0007000000000000	767	335785	0007000000000000	1000	336458	0002000000000000	682
730180	704070000000000000	735	837878	0000000000000000	354	335786	0007000000000000	680	336459	0002000000000000	730
730181	705700000000000000	000	335346	0000000000000000	140	335787	0007000000000000	680	336460	0002000000000000	703
730182	000700000000000000	1129	730276	4007000000000000	027	335788	0007000000000000	680	336461	0002000000000000	700
730183	000700000000000000	1014	337277	0007000000000000	669	335789	0007000000000000	680	336462	0002000000000000	684
730184	705700000000000000	042	337278	0007000000000000	769	335790	0007000000000000	680	336463	0002000000000000	784
730185	000700000000000000	000	335347	0000000000000000	425	335791	0007000000000000	680	336464	0002000000000000	684
730186	000700000000000000	703	335348	0000000000000000	724	335792	0007000000000000	680	336465	0002000000000000	711
730187	000700000000000000	075	730277	0007000000000000	760	335793	0007000000000000	680	336466	0002000000000000	777
730188	000700000000000000	000	334741	0007000000000000	027	335794	0007000000000000	680	336467	0002000000000000	700
730189	000700000000000000	669	734251	0007000000000000	685	335795	0007000000000000	680	336468	0002000000000000	531
730190	000700000000000000	018	734252	0007000000000000	741	335796	0007000000000000	680	336469	0002000000000000	682
730191	000700000000000000	615	334441	0007000000000000	056	335797	0007000000000000	680	336470	0002000000000000	684
730192	000700000000000000	000	334442	0007000000000000	057	335798	0007000000000000	680	336471	0002000000000000	669
730193	000700000000000000	377	334443	0007000000000000	056	335799	0007000000000000	680	336472	0002000000000000	684
730194	000700000000000000	707	734445	0007000000000000	159	335800	0007000000000000	680	336473	0002000000000000	680
730195	000700000000000000	203	734446	0007000000000000	179	335801	0007000000000000	680	336474	0002000000000000	680
730196	000700000000000000	337	334447	0007000000000000	143	335802	0007000000000000	680	336475	0002000000000000	680
730197	000700000000000000	900	334448	0007000000000000	103	335803	0007000000000000	680	336476	0002000000000000	680
730198	000700000000000000	1101	734449	0007000000000000	074	335804	0007000000000000	680	336477	0002000000000000	680
730199	000700000000000000	1147	334450	0007000000000000	099	335805	0007000000000000	680	336478	0002000000000000	680
730200	000700000000000000	620	334451	0007000000000000	099	335806	0007000000000000	680	336479	0002000000000000	680
730201	000700000000000000	110	734452	0007000000000000	099	335807	0007000000000000	680	336480	0002000000000000	680
730202	000700000000000000	705	734453	0007000000000000	099	335808	0007000000000000	680	336481	0002000000000000	680
730203	000700000000000000	675	734454	0007000000000000	099	335809	0007000000000000	680	336482	0002000000000000	680
730204	000700000000000000	675	734455	0007000000000000	099	335810	0007000000000000	680	336483	0002000000000000	680
730205	000700000000000000	572	734456	0007000000000000	099	335811	0007000000000000	680	336484	0002000000000000	680
730206	000700000000000000	643	734457	0007000000000000	099	335812	0007000000000000	680	336485	0002000000000000	680
730207	000700000000000000	629	334458	0007000000000000	099	335813	0007000000000000	680	336486	0002000000000000	680

```

10 LOC=0000
15 L=INT(RND(1)*95)+5:REM NO. OF
MINES
20 P=INT(RND(1)*80)+40:REM NO. OF
WORKERS
30 M=INT(RND(1)*50)+10:P=RE+
P*INT(RND(1)*40)+80:REM PRICE
OF ORE
40 P=INT(RND(1)*40)+80:REM PRICE
OF ORE
50 CE=INT(RND(1)*40)+80:REM ORE
PRODUCED/MINE
60 C=REM SETS ORE IN STORAGE T
O ZERO
70 S=1:REM SETS SATISFACTION FAC
TOR TO ZERO
80 Y=1:REM SETS YEARS TO ZERO
90 P=INT(RND(1)*2000)+2000:REM
BUYING/SELLING PRICE FOR MINES
100 CP=INT(RND(1)*12)+7:REM SELL
ING PRICE FOR ORE.
110 REM CURRENT STATE AFFAIRS OF
COLONY
120 PRINT"L"
130 PRINT"YEAR",Y
140 PRINT
150 PRINT"THEIR ARE",P,"WORKERS
IN THE COLONY."
160 PRINT"YOU HAVE",L,"MINES,AND
S",M
170 PRINT"SATISFACTION FACTOR IS
",S
180 PRINT
190 PRINT"YOUR MINES PRODUCE",CE
E,"TONS EACH."
200 C=C+CE*L
210 PRINT"AMOUNT OF ORE IN STORE
IS",C,"TONS"
220 PRINT
230 PRINT"SELLING",P
240 PRINT"
250 PRINT"ORE SELLING PRICE IS $
",CP,"PER TON"
260 PRINT"MINING SELLING PRICE IS
$",LP,"PER MINE"
270 REM ASKS HOW MUCH ORE TO SEL
L
280 PRINT"HOW MUCH ORE DO YOU WI
SH TO SELL?"
290 INPUTS
300 IF(C<0)GOTO320
310 REM TAKES AWAY SOLD ORE
320 C=C-5
340 M=M+CE*CP
350 REM ASKS HOW MANY MINES TO S
ELL
360 PRINT"HOW MANY MINES DO YOU
WISH TO SELL?"
370 INPUTS
380 IF(C<0)GOTO320
390 REM TAKES AWAY MINE(S)
400 L=L-L:IF(L<0)GOTO340
405 L=0
410 REM ASKS TO HOW MANY SUPPLY
420 M=M+L*S*L
430 PRINT"YOU NOW HAVE S",M
440 PRINT"BUYING",P
450 PRINT"
460 REM ASKS HOW MUCH TO SPEND O
N FOOD
470 PRINT"HOW MUCH TO SPEND ON F
OOD(AMPR-$100 EA.)?"
480 INPUTF
490 REM CHECKS IF THERE'S ENOUGH
MONEY
500 IF(F<0)GOTO320
510 REM ADJUSTS MONEY SUPPLY
520 M=M-F
530 F=0
540 REM ADJUSTS SATISFACTION FAC
TOR
550 IF(F<0)GOTO320
560 IF(F<0)GOTO320
570 REM ASKS HOW MANY MINES TO S
BUY
580 PRINT"
590 INPUTL
600 IF(C<0)GOTO320
610 REM INCREASE NO. OF MINES IF
NEEDED
620 L=L+L
630 REM ADJUSTS MONEY SUPPLY ACAT
N
640 L=L+L
650 REM CHECKS SATISFACTION FACT
OR
660 IF(S<0)GOTO320
670 IF(S<0)GOTO320
680 IF(S<0)GOTO320
690 IF(S<0)GOTO320
700 IF(S<0)GOTO320
710 IF(S<0)GOTO320
720 IF(S<0)GOTO320
730 IF(S<0)GOTO320
740 IF(S<0)GOTO320
750 IF(S<0)GOTO320
760 IF(S<0)GOTO320
770 IF(S<0)GOTO320
780 IF(S<0)GOTO320
790 IF(S<0)GOTO320
800 IF(S<0)GOTO320
810 IF(S<0)GOTO320
820 IF(S<0)GOTO320
830 IF(S<0)GOTO320
840 IF(S<0)GOTO320
850 IF(S<0)GOTO320
860 IF(S<0)GOTO320
870 IF(S<0)GOTO320
880 IF(S<0)GOTO320
890 IF(S<0)GOTO320
900 IF(S<0)GOTO320
910 IF(S<0)GOTO320
920 IF(S<0)GOTO320
930 IF(S<0)GOTO320
940 IF(S<0)GOTO320
950 IF(S<0)GOTO320
960 IF(S<0)GOTO320
970 IF(S<0)GOTO320
980 IF(S<0)GOTO320
990 IF(S<0)GOTO320

```

Mineral Rights

GN Woodhead,
Wyke,
Bradford.

BN-64

THIS IS AN adventure-type game. You are the leader of a mining colony in outer space and have to make decisions concerning the welfare of the planet. Full instructions are included within the program.

```

670 IF(S<0)GOTO320
680 IF(S<0)GOTO320
690 IF(S<0)GOTO320
700 IF(S<0)GOTO320
710 IF(S<0)GOTO320
720 IF(S<0)GOTO320
730 IF(S<0)GOTO320
740 IF(S<0)GOTO320
750 IF(S<0)GOTO320
760 IF(S<0)GOTO320
770 IF(S<0)GOTO320
780 IF(S<0)GOTO320
790 IF(S<0)GOTO320
800 IF(S<0)GOTO320
810 IF(S<0)GOTO320
820 IF(S<0)GOTO320
830 IF(S<0)GOTO320
840 IF(S<0)GOTO320
850 IF(S<0)GOTO320
860 IF(S<0)GOTO320
870 IF(S<0)GOTO320
880 IF(S<0)GOTO320
890 IF(S<0)GOTO320
900 IF(S<0)GOTO320
910 IF(S<0)GOTO320
920 IF(S<0)GOTO320
930 IF(S<0)GOTO320
940 IF(S<0)GOTO320
950 IF(S<0)GOTO320
960 IF(S<0)GOTO320
970 IF(S<0)GOTO320
980 IF(S<0)GOTO320
990 IF(S<0)GOTO320

```

(continued on next page)

ed or entered. A few pokes are required before calling the routine. Poke 65089 with the number of colours required in the border. Poke 65081 with the number corresponding to the first colour, Poke 65082 with the number corresponding to the second colour, and so on.

Finally, call the routine with

RANDOMISE USR 65000

The border will remain multicoloured until a key is pressed. The addresses are summarised in Table 1.

Table 1	
Start address	65000
No. of Colours	65080 Poke with a number between 2 and 8
1st colour	65081 Starting here, poke the required
2nd colour	65082 number of addresses with a number
3rd colour	65083 In the range 0-7
4th colour	65084
	0 = black 1 = blue 2 = red 3 = magenta 4 = green 5 = cyan
5th colour	65085
	6 = yellow 7 = white
6th colour	65086

Sultan's Tower

Remko Blakenburgh,
Leiden,
Holland.

SULTAN'S TOWER is an original, fast-moving action game which consists for the most part of machine-code. The scene is laid in Arabia in the middle ages. Fatima, the girl-friend of the Arabian prince Achmed, has been kidnapped by the wicked Sultan of Bahrain and put in his harem. She is detained on the upper floor of a tower, which consists of 10 floors.

You play the part of Achmed, who would rather keep his girl for himself. You must save Fatima but, to do so, you must reach the ninth floor starting off from the ground level. Each floor is divided into six parts which lie above each other. You must start off from the bottom part and ascend using ladders and ropes.

As the left of the upper part there is a doorway leading to the floor above you. When you have reached the upper part of the ninth floor you must grasp Fatima and run back downward. You can use slides to move down quickly. To descend to a floor below you, you should use the doorway at the left of the lower part of the floors.

When you have reached the ground level, you can leave the tower by walking through the exit at the left of the lower part and have a happy life together with Fatima. Unfortunately, it's rather difficult to save girls from harems. On every floor, harem-guards are busy chasing you. You had better beware of them because you will be sentenced to imprisonment for life if they get you.

As you progress, more harem-guards will be employed by the ugly sultan to make life hard for you. Each time you reach another floor, two more guards will try to make an end of your freedom.

Sometimes the harem-guards fall into holes. In that case, a guard can't harm you very much but after some time he will climb down

ed in table 1.

Examine the demonstration listing to see how all the above was achieved from within a Basic program.

If you are saving and loading from Microdrive, change the syntax of the relevant lines in listings 1 and 2.

Listing 3 is the routine in assembly

10 REM 20 REM 30 REM 40 REM 50 REM 60 REM 70 REM 80 REM 90 REM 100 REM 110 REM 120 REM 130 REM 140 REM 150 REM 160 REM 170 REM 180 REM 190 REM 200 REM 210 REM 220 REM 230 REM 240 REM 250 REM 260 REM 270 REM 280 REM 290 REM 300 REM 310 REM 320 REM 330 REM 340 REM 350 REM 360 REM 370 REM 380 REM 390 REM 400 REM 410 REM 420 REM 430 REM 440 REM 450 REM 460 REM 470 REM 480 REM 490 REM 500 REM 510 REM 520 REM 530 REM 540 REM 550 REM 560 REM 570 REM 580 REM 590 REM 600 REM 610 REM 620 REM 630 REM 640 REM 650 REM 660 REM 670 REM 680 REM 690 REM 700 REM 710 REM 720 REM 730 REM 740 REM 750 REM 760 REM 770 REM 780 REM 790 REM 800 REM 810 REM 820 REM 830 REM 840 REM 850 REM 860 REM 870 REM 880 REM 890 REM 900 REM 910 REM 920 REM 930 REM 940 REM 950 REM 960 REM 970 REM 980 REM 990 REM 1000 REM	1000 REM 1010 REM 1020 REM 1030 REM 1040 REM 1050 REM 1060 REM 1070 REM 1080 REM 1090 REM 1100 REM 1110 REM 1120 REM 1130 REM 1140 REM 1150 REM 1160 REM 1170 REM 1180 REM 1190 REM 1200 REM 1210 REM 1220 REM 1230 REM 1240 REM 1250 REM 1260 REM 1270 REM 1280 REM 1290 REM 1300 REM 1310 REM 1320 REM 1330 REM 1340 REM 1350 REM 1360 REM 1370 REM 1380 REM 1390 REM 1400 REM 1410 REM 1420 REM 1430 REM 1440 REM 1450 REM 1460 REM 1470 REM 1480 REM 1490 REM 1500 REM 1510 REM 1520 REM 1530 REM 1540 REM 1550 REM 1560 REM 1570 REM 1580 REM 1590 REM 1600 REM 1610 REM 1620 REM 1630 REM 1640 REM 1650 REM 1660 REM 1670 REM 1680 REM 1690 REM 1700 REM 1710 REM 1720 REM 1730 REM 1740 REM 1750 REM 1760 REM 1770 REM 1780 REM 1790 REM 1800 REM 1810 REM 1820 REM 1830 REM 1840 REM 1850 REM 1860 REM 1870 REM 1880 REM 1890 REM 1900 REM 1910 REM 1920 REM 1930 REM 1940 REM 1950 REM 1960 REM 1970 REM 1980 REM 1990 REM 2000 REM
--	--

to the part below him using a rope. You can use this rope later to climb up or down.

Your time to complete your mission is limited. If you run out of time, a pretty big bomb at the bottom of the tower will explode, destroying the tower with you and your girl.

The keys used to control the game are:

- 1 = up/jump
- J = down
- Y = right
- T = left
- O = hold

If you are not pleased with these key controls you can change them by poking:

- 16830, code of key for hold
- 16838, code of key up
- 16845, code of key down
- 16852, code of key left
- 16859, code of key right

You can abandon a game by pressing Shift on its own.

The machine-code is held in one large Rem-statement with line number zero. Before entering the machine-code, you must obtain this line. To do so, enter a line

11REM
followed by 128 characters — that's four full lines. Then, edit this line and change the line number to 2. Continue this procedure until you have lines 1-11. Finally, enter a line

12REM

followed by 77 characters.

You can check whether your lines have the correct length by entering:

PRINT PEEK 16396 - 256 * PEEK 16397
= 16508

You should get the number 1557. If not, check your lines and correct them where necessary. Now enter six direct commands, in succession:

- POKE 16510,0
- POKE 16511,17
- POKE 16512,6
- POKE 16514,118
- POKE 16515,118

You now have a massive Rem-statement of

language. You will find this useful if you have an assembler and wish to incorporate it into a larger machine code program. If you want to relocate the routine, simply change the Org address. Note that the routine will only run in the top 32K of memory. Num is the variable holding the number of colours, Col is for the actual colours.

1551 characters long with line number 0. Type in the hex-loader and enter the hex codes. I advise you to save the program at regular intervals in order to prevent you from losing all your work when a crash occurs.

After having entered the hex-codes, delete the hex-loader and type in the Basic program. Now save the program by entering:

RUN 9900

The way in which the program is saved may seem a bit cumbersome, but it is actually a means of reducing saving and loading time. It works like this: before saving, the system variable Ramtop is set to 0, whereby the display-file is reduced to its minimal size. Now the program is shortened for about 750 bytes, so loading time is considerably reduced. After saving, Ramtop will get back its previous value, 128, which causes the display-file to take its normal size.

I am aware of the fact that typing in machine-code programs can be rather tedious. Therefore, I will send you a tape version of my game if you send £3 to Remko Blakenburgh, Korenbleem 34, 2317 KX Leiden, Holland.

The hex loader

```

99 REM HEX-LOADER
100 PRINT "START ADDRESS"
110 INPUT A
120 REM FINISH ADDRESS
130 INPUT B
140 FOR N=0 TO B STEP 8
150 PRINT N
160 INPUT A
170 INPUT B
180 INPUT C
190 INPUT D
200 INPUT E
210 INPUT F
220 FOR K=1 TO LEN A STEP 2
230 LET C=CODE A$(K)+22+12*CC
240 LET E=C
250 FOR N=1 TO C
260 LET D=C+1
270 NEXT N
280 PRINT "TOTAL"
290 INPUT E
300 INPUT E
310 INPUT E
320 INPUT E
330 INPUT E
340 INPUT E
350 INPUT E
360 INPUT E
370 INPUT E
380 INPUT E
390 INPUT E
400 INPUT E
410 INPUT E
420 INPUT E
430 INPUT E
440 INPUT E
450 INPUT E
460 INPUT E
470 INPUT E
480 INPUT E
490 INPUT E
500 INPUT E
510 INPUT E
520 INPUT E
530 INPUT E
540 INPUT E
550 INPUT E
560 INPUT E
570 INPUT E
580 INPUT E
590 INPUT E
600 INPUT E
610 INPUT E
620 INPUT E
630 INPUT E
640 INPUT E
650 INPUT E
660 INPUT E
670 INPUT E
680 INPUT E
690 INPUT E
700 INPUT E
710 INPUT E
720 INPUT E
730 INPUT E
740 INPUT E
750 INPUT E
760 INPUT E
770 INPUT E
780 INPUT E
790 INPUT E
800 INPUT E
810 INPUT E
820 INPUT E
830 INPUT E
840 INPUT E
850 INPUT E
860 INPUT E
870 INPUT E
880 INPUT E
890 INPUT E
900 INPUT E
910 INPUT E
920 INPUT E
930 INPUT E
940 INPUT E
950 INPUT E
960 INPUT E
970 INPUT E
980 INPUT E
990 INPUT E
1000 INPUT E

```

(continued from previous page)

Program 1.

```

100 POKE 26,22 0
110 PRINT "*****"
120 PRINT "*****"
130 PRINT "*****"
140 PRINT "*****"
150 PRINT "*****"
160 PRINT "*****"
170 PRINT "*****"
180 PRINT "*****"
190 PRINT "*****"
200 PRINT "*****"
210 PRINT "*****"
220 PRINT "*****"
230 PRINT "*****"
240 PRINT "*****"
250 PRINT "*****"
260 PRINT "*****"
270 PRINT "*****"
280 PRINT "*****"
290 PRINT "*****"
300 PRINT "*****"
310 PRINT "*****"
320 PRINT "*****"
330 PRINT "*****"
340 PRINT "*****"
350 PRINT "*****"
360 PRINT "*****"
370 PRINT "*****"
380 PRINT "*****"
390 PRINT "*****"
400 PRINT "*****"
410 PRINT "*****"
420 PRINT "*****"
430 PRINT "*****"
440 PRINT "*****"
450 PRINT "*****"
460 PRINT "*****"
470 PRINT "*****"
480 PRINT "*****"
490 PRINT "*****"
500 PRINT "*****"
510 PRINT "*****"
520 PRINT "*****"
530 PRINT "*****"
540 PRINT "*****"
550 PRINT "*****"
560 PRINT "*****"
570 PRINT "*****"
580 PRINT "*****"
590 PRINT "*****"
600 PRINT "*****"
610 PRINT "*****"
620 PRINT "*****"
630 PRINT "*****"
640 PRINT "*****"
650 PRINT "*****"
660 PRINT "*****"
670 PRINT "*****"
680 PRINT "*****"
690 PRINT "*****"
700 PRINT "*****"
710 PRINT "*****"
720 PRINT "*****"
730 PRINT "*****"
740 PRINT "*****"
750 PRINT "*****"
760 PRINT "*****"
770 PRINT "*****"
780 PRINT "*****"
790 PRINT "*****"
800 PRINT "*****"
810 PRINT "*****"
820 PRINT "*****"
830 PRINT "*****"
840 PRINT "*****"
850 PRINT "*****"
860 PRINT "*****"
870 PRINT "*****"
880 PRINT "*****"
890 PRINT "*****"
900 PRINT "*****"
910 PRINT "*****"
920 PRINT "*****"
930 PRINT "*****"
940 PRINT "*****"
950 PRINT "*****"
960 PRINT "*****"
970 PRINT "*****"
980 PRINT "*****"
990 PRINT "*****"

```

The hex dump.

```

10014 00000000 00000000 00000000 00000000
10015 00000000 00000000 00000000 00000000
10016 00000000 00000000 00000000 00000000
10017 00000000 00000000 00000000 00000000
10018 00000000 00000000 00000000 00000000
10019 00000000 00000000 00000000 00000000
10020 00000000 00000000 00000000 00000000
10021 00000000 00000000 00000000 00000000
10022 00000000 00000000 00000000 00000000
10023 00000000 00000000 00000000 00000000
10024 00000000 00000000 00000000 00000000
10025 00000000 00000000 00000000 00000000
10026 00000000 00000000 00000000 00000000
10027 00000000 00000000 00000000 00000000
10028 00000000 00000000 00000000 00000000
10029 00000000 00000000 00000000 00000000
10030 00000000 00000000 00000000 00000000
10031 00000000 00000000 00000000 00000000
10032 00000000 00000000 00000000 00000000
10033 00000000 00000000 00000000 00000000
10034 00000000 00000000 00000000 00000000
10035 00000000 00000000 00000000 00000000
10036 00000000 00000000 00000000 00000000
10037 00000000 00000000 00000000 00000000
10038 00000000 00000000 00000000 00000000
10039 00000000 00000000 00000000 00000000
10040 00000000 00000000 00000000 00000000
10041 00000000 00000000 00000000 00000000
10042 00000000 00000000 00000000 00000000
10043 00000000 00000000 00000000 00000000
10044 00000000 00000000 00000000 00000000
10045 00000000 00000000 00000000 00000000
10046 00000000 00000000 00000000 00000000
10047 00000000 00000000 00000000 00000000
10048 00000000 00000000 00000000 00000000
10049 00000000 00000000 00000000 00000000
10050 00000000 00000000 00000000 00000000
10051 00000000 00000000 00000000 00000000
10052 00000000 00000000 00000000 00000000
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10054 00000000 00000000 00000000 00000000
10055 00000000 00000000 00000000 00000000
10056 00000000 00000000 00000000 00000000
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10058 00000000 00000000 00000000 00000000
10059 00000000 00000000 00000000 00000000
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10061 00000000 00000000 00000000 00000000
10062 00000000 00000000 00000000 00000000
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10064 00000000 00000000 00000000 00000000
10065 00000000 00000000 00000000 00000000
10066 00000000 00000000 00000000 00000000
10067 00000000 00000000 00000000 00000000
10068 00000000 00000000 00000000 00000000
10069 00000000 00000000 00000000 00000000
10070 00000000 00000000 00000000 00000000
10071 00000000 00000000 00000000 00000000
10072 00000000 00000000 00000000 00000000
10073 00000000 00000000 00000000 00000000
10074 00000000 00000000 00000000 00000000
10075 00000000 00000000 00000000 00000000
10076 00000000 00000000 00000000 00000000
10077 00000000 00000000 00000000 00000000
10078 00000000 00000000 00000000 00000000
10079 00000000 00000000 00000000 00000000
10080 00000000 00000000 00000000 00000000
10081 00000000 00000000 00000000 00000000
10082 00000000 00000000 00000000 00000000
10083 00000000 00000000 00000000 00000000
10084 00000000 00000000 00000000 00000000
10085 00000000 00000000 00000000 00000000
10086 00000000 00000000 00000000 00000000
10087 00000000 00000000 00000000 00000000
10088 00000000 00000000 00000000 00000000
10089 00000000 00000000 00000000 00000000
10090 00000000 00000000 00000000 00000000
10091 00000000 00000000 00000000 00000000
10092 00000000 00000000 00000000 00000000
10093 00000000 00000000 00000000 00000000
10094 00000000 00000000 00000000 00000000
10095 00000000 00000000 00000000 00000000
10096 00000000 00000000 00000000 00000000
10097 00000000 00000000 00000000 00000000
10098 00000000 00000000 00000000 00000000
10099 00000000 00000000 00000000 00000000
10100 00000000 00000000 00000000 00000000

```

Battle Tank

David Yip,
Carlisle,
Cumbria.



THE AIM OF the game is to destroy the enemy tank. In order to do so, you must shoot away the blocks between you and your enemy first — the number of blocks varies. It sounds simple but the catch is that you can only fire a maximum of three shots and a minimum of one shot. You and the other tank will fire at the blocks alternately. The game can be played by one or two players.

One player: You play against the computer and you have five lives. Every time you destroy an enemy tank, you get one point and the computer's intelligence level increases.

```

10 REM *** BATTLE TANK ***
20 RESTORE
30 PRINT "BATTLE TANK"
40 FOR I=1 TO 10: READ P1,X1,Y1:PRINT "P1,X1,Y1"
50 FOR I=1 TO 10: READ P2,X2,Y2:PRINT "P2,X2,Y2"
60 FOR I=1 TO 10: READ P3,X3,Y3:PRINT "P3,X3,Y3"
70 FOR I=1 TO 10: READ P4,X4,Y4:PRINT "P4,X4,Y4"
80 NEXT I
90 DATA 1,1,1,1,1,1,1,1,1,1
100 DATA 1,1,1,1,1,1,1,1,1,1
110 DATA 1,1,1,1,1,1,1,1,1,1
120 DATA 1,1,1,1,1,1,1,1,1,1
130 DATA 1,1,1,1,1,1,1,1,1,1
140 DATA 1,1,1,1,1,1,1,1,1,1
150 DATA 1,1,1,1,1,1,1,1,1,1
160 DATA 1,1,1,1,1,1,1,1,1,1
170 DATA 1,1,1,1,1,1,1,1,1,1
180 DATA 1,1,1,1,1,1,1,1,1,1
190 DATA 1,1,1,1,1,1,1,1,1,1
200 DATA 1,1,1,1,1,1,1,1,1,1
210 DATA 1,1,1,1,1,1,1,1,1,1
220 DATA 1,1,1,1,1,1,1,1,1,1
230 DATA 1,1,1,1,1,1,1,1,1,1
240 DATA 1,1,1,1,1,1,1,1,1,1
250 DATA 1,1,1,1,1,1,1,1,1,1
260 DATA 1,1,1,1,1,1,1,1,1,1
270 DATA 1,1,1,1,1,1,1,1,1,1
280 DATA 1,1,1,1,1,1,1,1,1,1
290 DATA 1,1,1,1,1,1,1,1,1,1
300 DATA 1,1,1,1,1,1,1,1,1,1
310 DATA 1,1,1,1,1,1,1,1,1,1
320 DATA 1,1,1,1,1,1,1,1,1,1
330 DATA 1,1,1,1,1,1,1,1,1,1
340 DATA 1,1,1,1,1,1,1,1,1,1
350 DATA 1,1,1,1,1,1,1,1,1,1
360 DATA 1,1,1,1,1,1,1,1,1,1
370 DATA 1,1,1,1,1,1,1,1,1,1
380 DATA 1,1,1,1,1,1,1,1,1,1
390 DATA 1,1,1,1,1,1,1,1,1,1
400 DATA 1,1,1,1,1,1,1,1,1,1
410 DATA 1,1,1,1,1,1,1,1,1,1
420 DATA 1,1,1,1,1,1,1,1,1,1
430 DATA 1,1,1,1,1,1,1,1,1,1
440 DATA 1,1,1,1,1,1,1,1,1,1
450 DATA 1,1,1,1,1,1,1,1,1,1
460 DATA 1,1,1,1,1,1,1,1,1,1
470 DATA 1,1,1,1,1,1,1,1,1,1
480 DATA 1,1,1,1,1,1,1,1,1,1
490 DATA 1,1,1,1,1,1,1,1,1,1
500 DATA 1,1,1,1,1,1,1,1,1,1
510 DATA 1,1,1,1,1,1,1,1,1,1
520 DATA 1,1,1,1,1,1,1,1,1,1
530 DATA 1,1,1,1,1,1,1,1,1,1
540 DATA 1,1,1,1,1,1,1,1,1,1
550 DATA 1,1,1,1,1,1,1,1,1,1
560 DATA 1,1,1,1,1,1,1,1,1,1
570 DATA 1,1,1,1,1,1,1,1,1,1
580 DATA 1,1,1,1,1,1,1,1,1,1
590 DATA 1,1,1,1,1,1,1,1,1,1
600 DATA 1,1,1,1,1,1,1,1,1,1
610 DATA 1,1,1,1,1,1,1,1,1,1
620 DATA 1,1,1,1,1,1,1,1,1,1
630 DATA 1,1,1,1,1,1,1,1,1,1
640 DATA 1,1,1,1,1,1,1,1,1,1
650 DATA 1,1,1,1,1,1,1,1,1,1
660 DATA 1,1,1,1,1,1,1,1,1,1
670 DATA 1,1,1,1,1,1,1,1,1,1
680 DATA 1,1,1,1,1,1,1,1,1,1
690 DATA 1,1,1,1,1,1,1,1,1,1
700 DATA 1,1,1,1,1,1,1,1,1,1
710 DATA 1,1,1,1,1,1,1,1,1,1
720 DATA 1,1,1,1,1,1,1,1,1,1
730 DATA 1,1,1,1,1,1,1,1,1,1
740 DATA 1,1,1,1,1,1,1,1,1,1
750 DATA 1,1,1,1,1,1,1,1,1,1
760 DATA 1,1,1,1,1,1,1,1,1,1
770 DATA 1,1,1,1,1,1,1,1,1,1
780 DATA 1,1,1,1,1,1,1,1,1,1
790 DATA 1,1,1,1,1,1,1,1,1,1
800 DATA 1,1,1,1,1,1,1,1,1,1
810 DATA 1,1,1,1,1,1,1,1,1,1
820 DATA 1,1,1,1,1,1,1,1,1,1
830 DATA 1,1,1,1,1,1,1,1,1,1
840 DATA 1,1,1,1,1,1,1,1,1,1
850 DATA 1,1,1,1,1,1,1,1,1,1
860 DATA 1,1,1,1,1,1,1,1,1,1
870 DATA 1,1,1,1,1,1,1,1,1,1
880 DATA 1,1,1,1,1,1,1,1,1,1
890 DATA 1,1,1,1,1,1,1,1,1,1
900 DATA 1,1,1,1,1,1,1,1,1,1
910 DATA 1,1,1,1,1,1,1,1,1,1
920 DATA 1,1,1,1,1,1,1,1,1,1
930 DATA 1,1,1,1,1,1,1,1,1,1
940 DATA 1,1,1,1,1,1,1,1,1,1
950 DATA 1,1,1,1,1,1,1,1,1,1
960 DATA 1,1,1,1,1,1,1,1,1,1
970 DATA 1,1,1,1,1,1,1,1,1,1
980 DATA 1,1,1,1,1,1,1,1,1,1
990 DATA 1,1,1,1,1,1,1,1,1,1

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(continued on page 110)

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(continued from page 108)

```

510 PLOT 4,17,"PLAYER 1
520 PLOT 1,18,5
530 PLOT 20,18,"P-1
540 PLOT 2,18,"abc abc abc abc"
550 PLOT 25,18,"P"
560 IF P=1 THEN GOTO
570 PLOT 23,19,"fgh fgh fgh fgh"
580 PLOT 27,12,"PLAYER 2"
590 PLOT 22,19,PRINT
600 IF P=2 THEN PRINT:GOTO 620
610 PRINT SPC(11) CHR$(27) "AHL SCORE =
"AH
620 PRINT "
630 PRINT:PRINT:PRINT
640 REM "*****"
650 PLOT 2,12," "
660 PLOT 1,12,5
670 PLOT 2,12,"abc"
680 PLOT 32,12,"4000"
690 FOR A=0 TO 31
700 PLOT A,12,A
710 NEXT A
720 BL=INT(640/32)*32
730 A=INT(32/32)*32
740 PLOT A+8,12,A
750 FOR V=0+8 TO 4+8+8
760 PLOT V,12,"* "
770 NEXT V
780 PLOT 22,14,STR$(BL)
790 PLOT 22,14,STR$(BL)
800 REM "*****"
810 BL=INT(640/32)*32
820 FOR A=0 TO 31
830 PLOT A,12,A
840 PLOT 22,14,STR$(BL)
850 REM "*****"
860 IF A=31 THEN A=0
870 PLOT A,12,A
880 GOTO 900
890 PLOT 2,12,5
900 PLOT 2,12,"abc"
910 PLOT 32,12,"4000"
920 FOR A=0 TO 31
930 PLOT A,12,A
940 PLOT 22,14,STR$(BL)
950 REM "*****"
960 IF A=31 THEN A=0
970 PLOT A,12,A
980 GOTO 1000
990 PLOT 2,12,5
1000 PLOT 2,12,"abc"
1010 PLOT 32,12,"4000"
1020 FOR A=0 TO 31
1030 PLOT A,12,A
1040 PLOT 22,14,STR$(BL)
1050 REM "*****"
1060 IF A=31 THEN A=0
1070 PLOT A,12,A
1080 GOTO 1100
1090 PLOT 2,12,5
1100 PLOT 2,12,"abc"
1110 PLOT 32,12,"4000"
1120 FOR A=0 TO 31
1130 PLOT A,12,A
1140 PLOT 22,14,STR$(BL)
1150 REM "*****"
1160 IF A=31 THEN A=0
1170 PLOT A,12,A
1180 GOTO 1200
1190 PLOT 2,12,5
1200 PLOT 2,12,"abc"
1210 PLOT 32,12,"4000"
1220 FOR A=0 TO 31
1230 PLOT A,12,A
1240 PLOT 22,14,STR$(BL)
1250 REM "*****"
1260 IF A=31 THEN A=0
1270 PLOT A,12,A
1280 GOTO 1300
1290 PLOT 2,12,5
1300 PLOT 2,12,"abc"
1310 PLOT 32,12,"4000"
1320 FOR A=0 TO 31
1330 PLOT A,12,A
1340 PLOT 22,14,STR$(BL)
1350 REM "*****"
1360 IF A=31 THEN A=0
1370 PLOT A,12,A
1380 GOTO 1400
1390 PLOT 2,12,5
1400 PLOT 2,12,"abc"
1410 PLOT 32,12,"4000"
1420 FOR A=0 TO 31
1430 PLOT A,12,A
1440 PLOT 22,14,STR$(BL)
1450 REM "*****"
1460 IF A=31 THEN A=0
1470 PLOT A,12,A
1480 GOTO 1500
1490 PLOT 2,12,5
1500 PLOT 2,12,"abc"
1510 PLOT 32,12,"4000"
1520 FOR A=0 TO 31
1530 PLOT A,12,A
1540 PLOT 22,14,STR$(BL)
1550 REM "*****"
1560 IF A=31 THEN A=0
1570 PLOT A,12,A
1580 GOTO 1600
1590 PLOT 2,12,5
1600 PLOT 2,12,"abc"
1610 PLOT 32,12,"4000"
1620 FOR A=0 TO 31
1630 PLOT A,12,A
1640 PLOT 22,14,STR$(BL)
1650 REM "*****"
1660 IF A=31 THEN A=0
1670 PLOT A,12,A
1680 GOTO 1700
1690 PLOT 2,12,5
1700 PLOT 2,12,"abc"
1710 PLOT 32,12,"4000"
1720 FOR A=0 TO 31
1730 PLOT A,12,A
1740 PLOT 22,14,STR$(BL)
1750 REM "*****"
1760 IF A=31 THEN A=0
1770 PLOT A,12,A
1780 GOTO 1800
1790 PLOT 2,12,5
1800 PLOT 2,12,"abc"
1810 PLOT 32,12,"4000"
1820 FOR A=0 TO 31
1830 PLOT A,12,A
1840 PLOT 22,14,STR$(BL)
1850 REM "*****"
1860 IF A=31 THEN A=0
1870 PLOT A,12,A
1880 GOTO 1900
1890 PLOT 2,12,5
1900 PLOT 2,12,"abc"
1910 PLOT 32,12,"4000"
1920 FOR A=0 TO 31
1930 PLOT A,12,A
1940 PLOT 22,14,STR$(BL)
1950 REM "*****"
1960 IF A=31 THEN A=0
1970 PLOT A,12,A
1980 GOTO 2000
1990 PLOT 2,12,5
2000 PLOT 2,12,"abc"
2010 PLOT 32,12,"4000"
2020 FOR A=0 TO 31
2030 PLOT A,12,A
2040 PLOT 22,14,STR$(BL)
2050 REM "*****"
2060 IF A=31 THEN A=0
2070 PLOT A,12,A
2080 GOTO 2100
2090 PLOT 2,12,5
2100 PLOT 2,12,"abc"
2110 PLOT 32,12,"4000"
2120 FOR A=0 TO 31
2130 PLOT A,12,A
2140 PLOT 22,14,STR$(BL)
2150 REM "*****"
2160 IF A=31 THEN A=0
2170 PLOT A,12,A
2180 GOTO 2200
2190 PLOT 2,12,5
2200 PLOT 2,12,"abc"
2210 PLOT 32,12,"4000"
2220 FOR A=0 TO 31
2230 PLOT A,12,A
2240 PLOT 22,14,STR$(BL)
2250 REM "*****"
2260 IF A=31 THEN A=0
2270 PLOT A,12,A
2280 GOTO 2300
2290 PLOT 2,12,5
2300 PLOT 2,12,"abc"
2310 PLOT 32,12,"4000"
2320 FOR A=0 TO 31
2330 PLOT A,12,A
2340 PLOT 22,14,STR$(BL)
2350 REM "*****"
2360 IF A=31 THEN A=0
2370 PLOT A,12,A
2380 GOTO 2400
2390 PLOT 2,12,5
2400 PLOT 2,12,"abc"
2410 PLOT 32,12,"4000"
2420 FOR A=0 TO 31
2430 PLOT A,12,A
2440 PLOT 22,14,STR$(BL)
2450 REM "*****"
2460 IF A=31 THEN A=0
2470 PLOT A,12,A
2480 GOTO 2500
2490 PLOT 2,12,5
2500 PLOT 2,12,"abc"
2510 PLOT 32,12,"4000"
2520 FOR A=0 TO 31
2530 PLOT A,12,A
2540 PLOT 22,14,STR$(BL)
2550 REM "*****"
2560 IF A=31 THEN A=0
2570 PLOT A,12,A
2580 GOTO 2600
2590 PLOT 2,12,5
2600 PLOT 2,12,"abc"
2610 PLOT 32,12,"4000"
2620 FOR A=0 TO 31
2630 PLOT A,12,A
2640 PLOT 22,14,STR$(BL)
2650 REM "*****"
2660 IF A=31 THEN A=0
2670 PLOT A,12,A
2680 GOTO 2700
2690 PLOT 2,12,5
2700 PLOT 2,12,"abc"
2710 PLOT 32,12,"4000"
2720 FOR A=0 TO 31
2730 PLOT A,12,A
2740 PLOT 22,14,STR$(BL)
2750 REM "*****"
2760 IF A=31 THEN A=0
2770 PLOT A,12,A
2780 GOTO 2800
2790 PLOT 2,12,5
2800 PLOT 2,12,"abc"
2810 PLOT 32,12,"4000"
2820 FOR A=0 TO 31
2830 PLOT A,12,A
2840 PLOT 22,14,STR$(BL)
2850 REM "*****"
2860 IF A=31 THEN A=0
2870 PLOT A,12,A
2880 GOTO 2900
2890 PLOT 2,12,5
2900 PLOT 2,12,"abc"
2910 PLOT 32,12,"4000"
2920 FOR A=0 TO 31
2930 PLOT A,12,A
2940 PLOT 22,14,STR$(BL)
2950 REM "*****"
2960 IF A=31 THEN A=0
2970 PLOT A,12,A
2980 GOTO 3000
2990 PLOT 2,12,5
3000 PLOT 2,12,"abc"
3010 PLOT 32,12,"4000"
3020 FOR A=0 TO 31
3030 PLOT A,12,A
3040 PLOT 22,14,STR$(BL)
3050 REM "*****"
3060 IF A=31 THEN A=0
3070 PLOT A,12,A
3080 GOTO 3100
3090 PLOT 2,12,5
3100 PLOT 2,12,"abc"
3110 PLOT 32,12,"4000"
3120 FOR A=0 TO 31
3130 PLOT A,12,A
3140 PLOT 22,14,STR$(BL)
3150 REM "*****"
3160 IF A=31 THEN A=0
3170 PLOT A,12,A
3180 GOTO 3200
3190 PLOT 2,12,5
3200 PLOT 2,12,"abc"
3210 PLOT 32,12,"4000"
3220 FOR A=0 TO 31
3230 PLOT A,12,A
3240 PLOT 22,14,STR$(BL)
3250 REM "*****"
3260 IF A=31 THEN A=0
3270 PLOT A,12,A
3280 GOTO 3300
3290 PLOT 2,12,5
3300 PLOT 2,12,"abc"
3310 PLOT 32,12,"4000"
3320 FOR A=0 TO 31
3330 PLOT A,12,A
3340 PLOT 22,14,STR$(BL)
3350 REM "*****"
3360 IF A=31 THEN A=0
3370 PLOT A,12,A
3380 GOTO 3400
3390 PLOT 2,12,5
3400 PLOT 2,12,"abc"
3410 PLOT 32,12,"4000"
3420 FOR A=0 TO 31
3430 PLOT A,12,A
3440 PLOT 22,14,STR$(BL)
3450 REM "*****"
3460 IF A=31 THEN A=0
3470 PLOT A,12,A
3480 GOTO 3500
3490 PLOT 2,12,5
3500 PLOT 2,12,"abc"
3510 PLOT 32,12,"4000"
3520 FOR A=0 TO 31
3530 PLOT A,12,A
3540 PLOT 22,14,STR$(BL)
3550 REM "*****"
3560 IF A=31 THEN A=0
3570 PLOT A,12,A
3580 GOTO 3600
3590 PLOT 2,12,5
3600 PLOT 2,12,"abc"
3610 PLOT 32,12,"4000"
3620 FOR A=0 TO 31
3630 PLOT A,12,A
3640 PLOT 22,14,STR$(BL)
3650 REM "*****"
3660 IF A=31 THEN A=0
3670 PLOT A,12,A
3680 GOTO 3700
3690 PLOT 2,12,5
3700 PLOT 2,12,"abc"
3710 PLOT 32,12,"4000"
3720 FOR A=0 TO 31
3730 PLOT A,12,A
3740 PLOT 22,14,STR$(BL)
3750 REM "*****"
3760 IF A=31 THEN A=0
3770 PLOT A,12,A
3780 GOTO 3800
3790 PLOT 2,12,5
3800 PLOT 2,12,"abc"
3810 PLOT 32,12,"4000"
3820 FOR A=0 TO 31
3830 PLOT A,12,A
3840 PLOT 22,14,STR$(BL)
3850 REM "*****"
3860 IF A=31 THEN A=0
3870 PLOT A,12,A
3880 GOTO 3900
3890 PLOT 2,12,5
3900 PLOT 2,12,"abc"
3910 PLOT 32,12,"4000"
3920 FOR A=0 TO 31
3930 PLOT A,12,A
3940 PLOT 22,14,STR$(BL)
3950 REM "*****"
3960 IF A=31 THEN A=0
3970 PLOT A,12,A
3980 GOTO 3990
3990 PLOT 2,12,5
4000 PLOT 2,12,"abc"

```

Header reader

H.V. Smith,
Bracon,
Powys.



I HAVE WRITTEN a program similar to ones published previously for other computers e.g. the ZX Spectrum or the Amstrad CPC-464. It is a program written in Basic with a short accompanying Z80 machine-code routine which reads the header at the beginning of a file on tape and interprets this to give the user the information recorded there, which is normally inaccessible to the user.

On running, the program first returns the screen display to its default conditions as at startup when switching on. This is achieved by the two calls to the firmware jumpblock. Call &B8FF and Call &B84E. Using these two simple calls avoids having to reset all the separate aspects of the screen display i.e. the Mode, Pm, Paper, Ink settings etc. These two calls are in fact quite useful in any program at the beginning to make sure that the effect of printing on the screen can be entirely predictable.

It then calls the subroutine at line 230 and onwards which simply pokes in the short machine code routine at 41000 onwards. It also lowers Hizen to 59999 to give space for the routine and for the storage of the data obtained from the header, the amount of space allocated being in fact more than adequate, though this fact is unlikely to mean that there is insufficient memory left for use by any program residing in memory, mainly because it is unlikely that any program other than the header reader would be in the memory.

The program then calls the machine code routine which starts the tape and searches for the header at the beginning of a file. Since the routine uses quite a low level Rom routine

```

10 REM *****
20 REM ** (c) Howard V. Smith 1985 **
30 REM *****
40 CALL &B8FF:CALL &B84E
50 GOSUB 230
60 POKE 40030,0:CALL 41000:IF PEEK(40030)=253 THEN PRI
NT"Escape pressed...":PRINT:GOTO 210 ELSE IF PEEK(400
30)<0 THEN PRINT"Type Er
ror":PRINT:GOTO 210
70 PRINT SPACE$(7) "Tape Header Reader :":PRINT CHR$(2
1):CHR$(11):CHR$(11):SPACE$(7):STR$(18,"_"):CHR$(22)
:CHR$(8)
80 PRINT:PRINT:PRINT"Filename :":t=t+0:FOR a=40000 TO
40015:PRINT CHR$(PEEK(a)):t=t+PEEK(a):NEXT a:IF t=0 THE
N PRINT"Unnamed File":
90 PRINT:PRINT:PRINT"Block Number :":PEEK(40016)
100 PRINT:PRINT"Last Block ? :":IF PEEK(40017)=0 THE
N PRINT"No."ELSE PRINT"Yes."
110 PRINT:PRINT"File Type :":a=PEEK(40018)
120 a$=BIN$(a,8)
130 t=VAL(MID$(a$,5,3)):IF t=0 THEN PRINT"BASIC Progra
m"ELSE IF t=1 THEN PRINT"Binary File"ELSE IF t=2 THEN
PRINT"Screen Image"ELSE
IF t=3 THEN PRINT"ASCII File"ELSE PRINT"Unknown."
140 PRINT:PRINT"Protected ? :":IF VAL(RIGHT$(a$,1))=
1 THEN PRINT"Yes."ELSE PRINT"No."
150 PRINT:PRINT"Length Of Data In Block :":PEEK(40019)
250+PEEK(40020):"Bytes"
160 PRINT:PRINT"Address From Which Written :":PEEK(400
21)+256+PEEK(40022)
170 PRINT:PRINT"First Block ? :":IF PEEK(40023)=0 TH
EN PRINT"No."ELSE PRINT"Yes."
180 PRINT:PRINT"Total Length Of File :":PEEK(40024)+25
6+PEEK(40025):"Bytes"
190 PRINT:PRINT"Entry Address :":a=PEEK(40026)+256+P
EEK(40027):IF a THEN PRINT a ELSE PRINT"N/A"
200 LOCATE 1,25
210 PRINT"Continue...":t=t+1:WHILE t=t+1:IF t=INKEY:WE
ND:CLS:IF LOW$(t)<">" THEN 60
220 END

```

(continued on facing page)

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Please check with us if you decide to use any other disc interface than Acorn or Double-Dos with Scribe or Database.

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The Advanced

Commodore 64-CENTRONICS

Interface / Printer Utility



COMPATABLE HARDWARE - CABLES

The printer is connected to the 64 via the user port. Pins A to H are used - (PA2 is strobe and FLG to Acknowledge). A proper shielded multi-core cable is supplied (if needed) rather than ribbon. It works fine with 'EASY SCRIPT'.

SOFTWARE - This program is fitted a disposable Auto-Relocator which enables it to Co-exist with most other utilities. You can, if desired, specify an address on loading. Another feature is put you in control!

IF YOU ALREADY HAVE A CABLE - WE CAN ADVISE YOU ON ITS SUITABILITY - YOU NEED ONLY PURCHASE THE SOFTWARE.

THIS PROGRAM HAS BEEN TESTED WITH BOTH DOT MATRIX AND DAISY WHEEL TYPE PRINTERS WITH EXCELLENT RESULTS

VERSATILE

As stated at the top of the page, this whole page was printed out in just one run and not just 'stuck together' for the benefit of this advert! Proof of what is possible when using 'CENTIPEDE'. So far I have used three with the printers' own font. There's more:-



Above, I have taken a piece of hires screen, and by using a simple FOR-NEXT loop, have dumped it here using each of the modes available on my printer. I even have a choice of 4 ROTATIONS (The 4th can be for shading). The rotation can be used in both low and hires and can be either a whole screen or just one character square. There are over 20 commands, and 255 secondary addresses, giving the user plenty of freedom to give his printer precisely whatever tricks it was designed to, and perhaps a few the makers hadn't thought about it.

The writer has even made some amendments to the operating system of the 64, just to make life a little easier. You can print, 'CENTIPEDE' Control codes, or maybe, 'CENTIPEDE' Control codes. Or if you're just not in the mood for opening and closing files, then you can use the 'H' command which does it all for you! Generally, the use of ESC codes has been cut to the minimum so you may enjoy using your printer to the maximum. Of course, you can still use this utility as though the extra features didn't exist. I don't want to change tradition... too much. Whichever way you want to use your printer. You'll find the way with 'CENTIPEDE'.

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DATEBASE

Local, national and international micro events are updated here.

IBM PC Users Show

Open to the general public as at least you can wander in and first-hand yourself with Big Blue.

The exhibition takes place at Olympia 2 from July 2-4. More information available from EMAP Business and Computer Publications on 01 837 3694.

Making Music

Be warned, some days are trade only so check with the organisers before you wander in and check out all the new chip and computer related ways of making music.

The event more properly known as the British Music Fair takes place from July 30-August 4 (first three days trade only) at Olympia 2. Organised by Pubsch Events, London. Telephone 04-985 1200.



Quanta Learning Systems of Guildford has been awarded a contract by IGI to produce the training manual for the recently launched *Agriuser Information Service*. The guide is for use by British Farmers and Agricultural Merchants who have access to the service.

Using a pictorial step-by-step approach, which won Quanta the 1985 RITA Award for the best users' training manual of the year, the guide is designed to build up the confidence of users in simple stages and to provide an "easy-to-use" reference to operating the system.

"Move-on" experience for Quanta's chief executive Tony Jones as he researches the *Agriuser Training Manual* down on the farm.

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